Owner's Operator and Maintenance Manual

Pronto® M91™ with SureStep®

DEALER: This manual MUST be given to the user of the wheelchair.

USER: BEFORE using this wheelchair, read this manual and save for future reference.

For more information regarding Invacare products, parts, and services, please visit www.invacare.com

INVACARE®

Yes, you can.®

⚠ WARNING

A qualified technician MUST perform the initial set up of this wheelchair. Also, a qualified technician MUST perform all procedures in the service manual.

DO NOT use this product or any available optional equipment without first completely reading and understanding these instructions and any additional instructional material such as owner's manuals, service manuals or instruction sheets supplied with this product or optional equipment. If you are unable to understand the warnings, cautions or instructions, contact a healthcare professional, dealer or technical personnel before attempting to use this equipment - otherwise, injury or damage may occur.

⚠ ACCESSORIES WARNING

Invacare products are specifically designed and manufactured for use in conjunction with Invacare accessories. Accessories designed by other manufacturers have not been tested by Invacare and are not recommended for use with Invacare products.

REFERENCE DOCUMENTS

MANUAL	PART NUMBER
MK_5™ NX™ Electronic Owner Manual	1110532
M91/M94™ Service Manual	1125038
Quad Link Instruction Sheet	1134844

NOTE: Updated versions of this manual are available on www.invacare.com.

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REGISTER YOUR PRODUCT

The benefits of registering include:

1. Safeguarding your investment.
2. Ensuring long-term maintenance and servicing of your product.
3. Receiving updates with product information, maintenance tips and industry news.

Register ONLINE at warranty.invacare.com

Please have your model number and purchase date available to complete your registration.

Any registration information you submit will only be used by Invacare Corporation and protected as required by applicable laws and regulations.

SPECIAL NOTES

Signal words are used in this manual and apply to hazards or unsafe practices which could result in personal injury or property damage. Refer to the table below for definitions of the signal words.

SIGNAL WORD	MEANING
DANGER	Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Caution indicates a potentially hazardous situation which, if not avoided, may result in property damage.

NOTICE

THE INFORMATION CONTAINED IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE.

WHEELCHAIR USER

As a manufacturer of wheelchairs, Invacare endeavors to supply a wide variety of wheelchairs to meet many needs of the end user. However, final selection of the type of wheelchair to be used by an individual rests solely with the user and his/her healthcare professional capable of making such a selection.

WHEELCHAIR TIE-DOWN RESTRAINTS AND SEAT RESTRAINTS

As of this date, the Department of Transportation has not approved any tie-down systems for transportation of a user while in a wheelchair, in a moving vehicle of any type. It is Invacare's position that users of wheelchairs should be transferred into appropriate seating in vehicles for transportation and use be made of the restraints made available by the auto industry. Invacare cannot and does not recommend any wheelchair transportation systems.

⚠ WARNING

Invacare products are specifically designed and manufactured for use in conjunction with Invacare accessories. Accessories designed by other manufacturers have not been tested by Invacare and are not recommended for use with Invacare products.

The seat positioning strap is a positioning belt only. It is not designed for use as a safety device withstanding high stress loads such as auto or aircraft safety belts. If signs of wear appear, belt must be replaced IMMEDIATELY.

POWERED SEATING SYSTEMS ONLY - This seating system has been custom designed and will be assembled to the wheelchair base before delivery to the user. The information contained in this manual is for maintaining and adjusting the seating system. There are very few adjustments that can safely be made by the user. If there is a procedure or adjustment that needs to be performed on the seating system that is not in this manual, do not perform that procedure. Have the seating system serviced by a qualified technician.

⚠ WARNING

The drive behavior initially experienced by the user may be different from other chairs previously used. This Power Wheelchair has Invacare's SureStep technology, a feature that provides the wheelchair with optimum traction and stability when driving forward over transitions and thresholds of up to 3-inches. The following warnings apply specifically to the SureStep Feature.

- **DO NOT use on inclines greater than 9°.**
- **DO NOT use on inclines with wet, slippery, icy or oily surfaces. This may include certain painted or otherwise treated wood surfaces.**
- **DO NOT traverse down ramps at high speed. Doing so will reduce traction and increase stopping distance.**
- **The end user's weight can materially affect traction on sloped surfaces. Great care should be taken when traversing such slopes.**

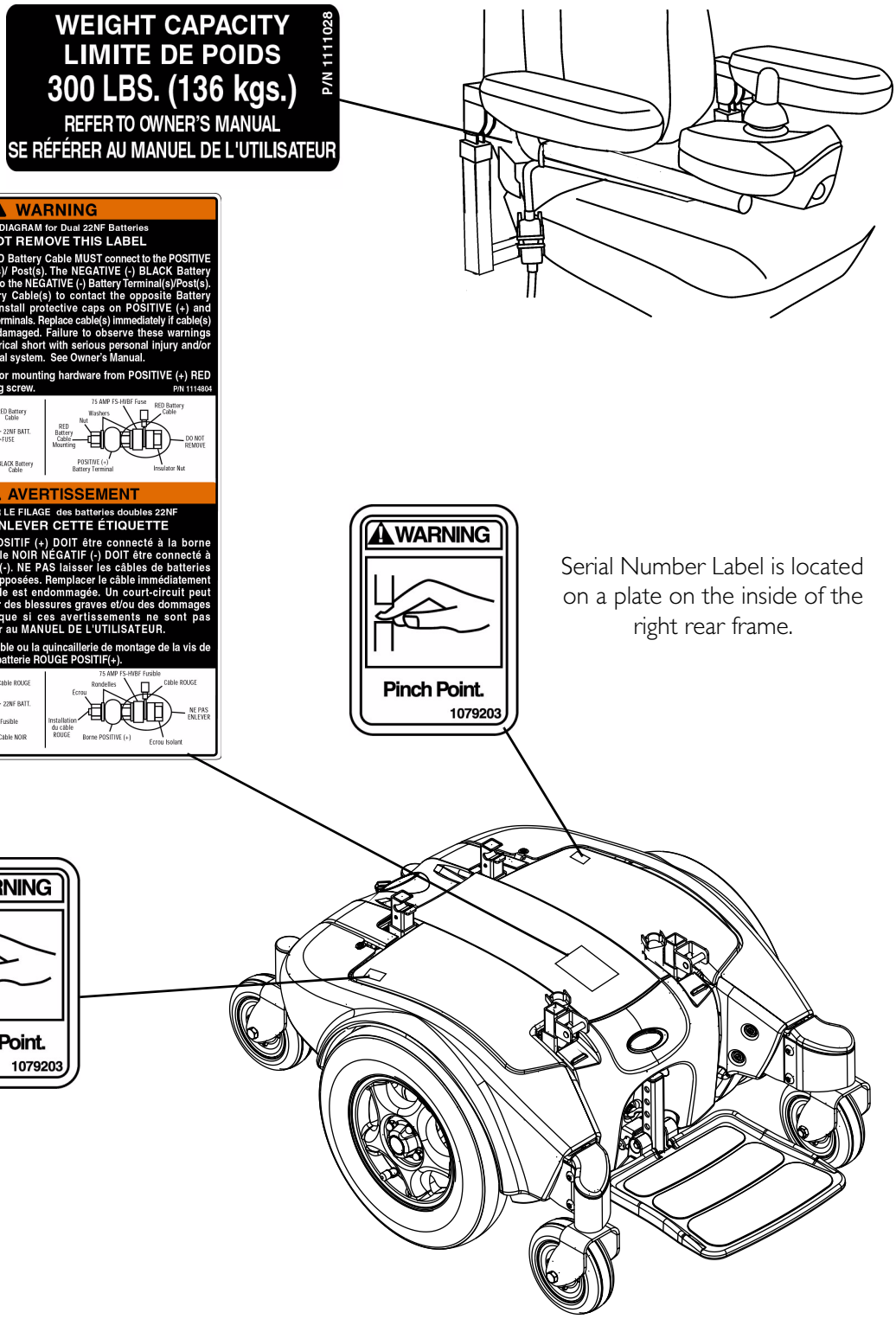
To determine and establish your particular safety limits, practice use of this product on various sloping surfaces in the presence of a qualified healthcare provider before attempting active use of this wheelchair. Other general warnings listed within this document also apply.

Wheelchairs should be examined during maintenance for signs of corrosion (water exposure, incontinence, etc.). Electrical components damaged by corrosion should be replaced IMMEDIATELY.

Wheelchairs that are used by incontinent users and/or are frequently exposed to water may require replacement of electrical components more frequently.

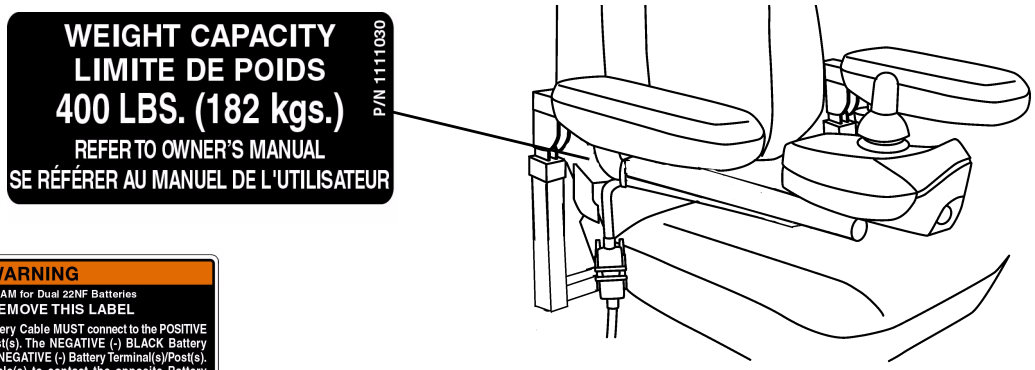
LABEL LOCATIONS

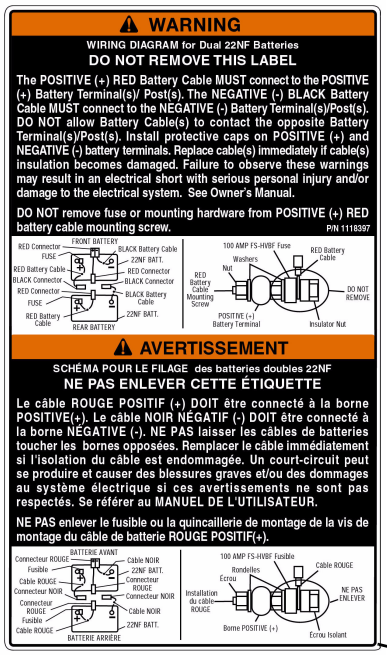
M91 Standard


WEIGHT CAPACITY
LIMITE DE POIDS
300 LBS. (136 kgs.)
REFER TO OWNER'S MANUAL
SE RÉFÉRER AU MANUEL DE L'UTILISATEUR
P/N 1111028
WARNING
WIRING DIAGRAM for Dual 22NF Batteries
DO NOT REMOVE THIS LABEL
The POSITIVE (+) RED Battery Cable MUST connect to the POSITIVE (+) Battery Terminal(s)/ Post(s). The NEGATIVE (-) BLACK Battery Cable MUST connect to the NEGATIVE (-) Battery Terminal(s)/Post(s). DO NOT allow Battery Cable(s) to contact the opposite Battery Terminal(s)/Post(s). Install protective caps on POSITIVE (+) and NEGATIVE (-) battery terminals. Replace cable(s) immediately if cable(s) insulation becomes damaged. Failure to observe these warnings may result in an electrical short with serious personal injury and/or damage to the electrical system. See Owner's Manual.
DO NOT remove fuse or mounting hardware from POSITIVE (+) RED battery cable mounting screw.
P/N 1114804
AVERTISSEMENT
SCHÉMA POUR LE FILAGE des batteries doubles 22NF
NE PAS ENLEVER CETTE ÉTIQUETTE
Le câble ROUGE POSITIF (+) DOIT être connecté à la borne POSITIVE(+). Le câble NOIR NÉGATIF (-) DOIT être connecté à la borne NÉGATIVE (-). NE PAS laisser les câbles de batteries toucher les bornes opposées. Remplacer le câble immédiatement si l'isolation du câble est endommagée. Un court-circuit peut se produire et causer des blessures graves et/ou des dommages au système électrique si ces avertissements ne sont pas respectés. Se référer au MANUEL DE L'UTILISATEUR.
NE PAS enlever le fusible ou la quincaillerie de montage de la vis de montage du câble de batterie ROUGE POSITIF(+).
WARNING
Pinch Point.
1079203
WARNING
Pinch Point.
1079203

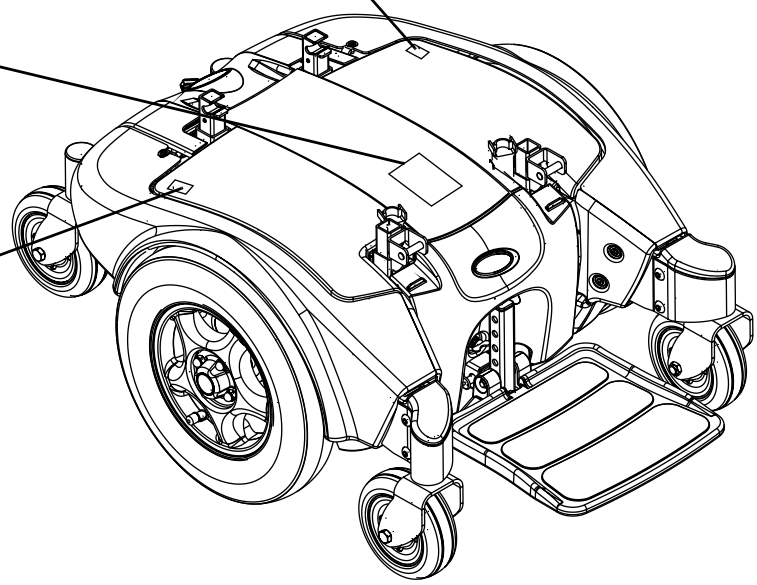
Serial Number Label is located on a plate on the inside of the right rear frame.

M91 Heavy Duty



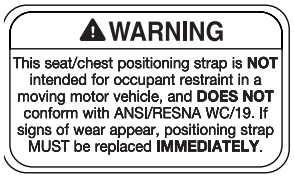

WARNING
WIRING DIAGRAM for Dual 22NF Batteries
DO NOT REMOVE THIS LABEL
The POSITIVE (+) RED Battery Cable MUST connect to the POSITIVE (+) Battery Terminal(s)/ Post(s). The NEGATIVE (-) BLACK Battery Cable MUST connect to the NEGATIVE (-) Battery Terminal(s)/Post(s). DO NOT allow Battery Cable(s) to contact the opposite Battery Terminal(s)/Post(s). Install protective caps on POSITIVE (+) and NEGATIVE (-) battery terminals. Replace cable(s) immediately if cable(s) insulation becomes damaged. Failure to observe these warnings may result in an electrical short with serious personal injury and/or damage to the electrical system. See Owner's Manual.
DO NOT remove fuse or mounting hardware from POSITIVE (+) RED battery cable mounting screw.
P/N 1118397
AVERTISSEMENT
SCHÉMA POUR LE FILAGE des batteries doubles 22NF
NE PAS ENLEVER CETTE ÉTIQUETTE
Le câble ROUGE POSITIF (+) DOIT être connecté à la borne POSITIVE(+). Le câble NOIR NÉGATIF (-) DOIT être connecté à la borne NÉGATIVE (-). NE PAS laisser les câbles de batteries toucher les bornes opposées. Remplacer le câble immédiatement si l'isolation du câble est endommagée. Un court-circuit peut se produire et causer des blessures graves et/ou des dommages au système électrique si ces avertissements ne sont pas respectés. Se référer au MANUEL DE L'UTILISATEUR.
NE PAS enlever le fusible ou la quincaillerie de montage de la vis de montage du câble de batterie ROUGE POSITIF(+).

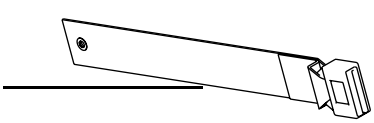
Serial Number Label is located on a plate on the inside of the right rear frame.



All Wheelchairs

NOTE: Auto style seat positioning strap shown. This label is also on the airline style seat positioning strap.


WARNING
This seat/chest positioning strap is NOT intended for occupant restraint in a moving motor vehicle, and DOES NOT conform with ANSI/RESNA WC/19. If signs of wear appear, positioning strap MUST be replaced IMMEDIATELY.



TYPICAL PRODUCT PARAMETERS

PRONTO M91

	18-INCH VAN SEAT	20-INCH VAN SEAT	22-INCH VAN SEAT
SEAT WIDTH RANGE:	18 inches	20 inches	22 inches
SEAT DEPTH:	16 -18 inches	18-20 inches	20-22 inches
BACK HEIGHT W/O HEADREST SEMI RECLINE:	18 inches	18 inches	18 inches
BACK ANGLE RANGE SEMI RECLINE:	35° to 115°	35° to 115°	35° to 115°
UPHOLSTERY:	Grey Vinyl, Grey Cloth, Tan Vinyl		
SEAT-TO-FLOOR:	22½ to 23½ inches (Cushion Not Compressed)		
OVERALL WIDTH (NO JOYSTICK):	25-7/8 inches		
OVERALL HEIGHT:	36-49¼ inches (Semi Recline Back)		
OVERALL LENGTH:	39 inches (With Footboard Folded)		
DRIVE WHEELS/TIRES:	14 x 3-inch		
CASTERS:	6 x 2-inch Front/Rear with Precision Sealed Bearings		
FOOTRESTS/LEGRESTS:	Flip Up, Depth and Height Adjustable, Footboard, Swingaway Front Rigging, Elevating Legrest, Center Mount		
WEIGHT W/SEATING SYSTEM AND ACCESSORIES W/O BATTERIES: W/BATTERIES:	 199 lbs 273 lbs		
SHIPPING:	260 lbs (w/o Batteries), 310 lbs (w/Batteries)		
ARMRESTS:	Adjustable Angle, Depth and Width		
BATTERIES:	22NF - Quantity 2		
INCLINE CAPABILITY:	9°		
PERFORMANCE SPEED Standard: Heavy Duty: TURNING RADIUS: *RANGE (VARIABLE) Standard: Heavy Duty: **WEIGHT LIMITATION Standard: Heavy Duty:	 0 to 6.4 mph 0 to 4.25 mph 19½ inches (Front with Footboard); 21½ inches (Rear) 22 miles 12-16 miles 300 lbs 400 lbs		

NOTE: Based on 18-inch deep Van seat.

**NOTE: Values for range are calculated for maximum chair weight rating using largest batteries applicable (22NF), per test procedures described in ANSI/RESNA WC/VOL2-1998 Section 4 and meet federal reimbursement requirements for this product. While considered typical, they are derived based on certain ideal conditions. Variances in battery condition, user weight, usage pattern or overall terrain conditions will result in actual values for range that differ from these stated values. Users should become accustomed to how their unique conditions impact their individual results. Users should become familiar with the battery discharge indicator on the joystick to determine the range of their wheelchair. Refer to Battery Charger Operation on page 65 for more information about the battery discharge indicator.*

***NOTE: Refer to Stability and Balance on page 20.*

SECTION 1—GENERAL GUIDELINES

⚠ WARNING

SECTION 1 - GENERAL GUIDELINES contains important information for the safe operation and use of this product.

Controller Settings/Repair or Service

Set-up of the Electronic Control Unit is to be performed ONLY by a qualified technician. The final adjustments of the controller may affect other activities of the wheelchair. Damage to the equipment could occur if improperly set-up or adjusted.

DO NOT service or adjust your wheelchair while occupied, unless otherwise noted.

Wheelchairs should be examined during maintenance for signs of corrosion (water exposure, incontinence, etc.). Electrical components damaged by corrosion should be replaced IMMEDIATELY.

Wheelchairs that are used by incontinent users and/or are frequently exposed to water may require replacement of electrical components more frequently.

Accessories Information

Invacare products are specifically designed and manufactured for use in conjunction with Invacare accessories. Accessories designed by other manufacturers have not been tested by Invacare and are not recommended for use with Invacare products.

EXTREME care should be exercised when using oxygen in close proximity to electric circuits and other combustible materials. Contact your oxygen supplier for instruction in the use of oxygen.

Operation Information

Performance adjustments should only be made by professionals of the healthcare field or persons fully conversant with this process and the driver's capabilities. Incorrect settings could cause injury to the driver, bystanders, damage to the wheelchair and to surrounding property.

After the wheelchair has been set-up, check to make sure that the wheelchair performs to the specifications entered during the set-up procedure. If the wheelchair does NOT perform to specifications, turn the wheelchair Off IMMEDIATELY and reenter set-up specifications. Repeat this procedure until the wheelchair performs to specifications.

ALWAYS shift your weight in the direction you are turning. DO NOT shift your weight in the opposite direction of the turn. Shifting your weight in the opposite direction of the turn may cause the inside drive wheel to lose traction and the wheelchair to tip over.

DO NOT shift your weight or sitting position toward the direction you are reaching as the wheelchair may tip over.

DO determine and establish your particular safety limits by practicing bending, reaching and transferring activities in the presence of a qualified healthcare professional before attempting active use of the wheelchair.

DO NOT attempt to reach objects if you have to move forward in the seat.

DO NOT attempt to reach objects if you have to pick them up from the floor by reaching down between your knees.

DO NOT lean over the top of the back upholstery to reach objects behind you, as this may cause the wheelchair to tip over.

ALWAYS keep hands and fingers clear of moving parts to avoid injury.

DO NOT store items under seat - interference with seat latch may result.

DO NOT use an escalator to move a wheelchair between floors. Serious bodily injury may occur.

DO NOT engage or disengage the motor release levers until the power is in the Off position.

DO NOT attempt to stop a moving wheelchair with wheel locks. Wheel locks are not brakes.

DO NOT operate on roads, streets or highways.

DO NOT climb, go up or down ramps or traverse slopes greater than 9°.

NEVER leave an unoccupied wheelchair on an incline.

Invacare strongly recommends proceeding down ramps or slopes at half speed or slower and to avoid hard braking or sudden stops.

DO NOT leave elevating legrests in the fully extended position when proceeding down ramps or slopes.

DO NOT attempt to move up or down an incline with a water, ice or oil film.

DO NOT attempt to drive over curbs or obstacles. Doing so may cause your wheelchair to turn over and cause bodily harm or damage to the wheelchair.

DO NOT leave the power button in the On position when entering or exiting your wheelchair.

DO NOT attempt to lift the wheelchair by any removable (detachable) parts. Lifting by means of any removable (detachable) parts of the wheelchair may result in injury to the user or damage to the wheelchair.

DO NOT stand on the frame of the wheelchair.

DO NOT stand on the footplates/footboard. When getting in or out of the wheelchair, make sure that the footboard or footplates are in the upward position or swing the footrests towards the outside of the wheelchair.

Before attempting to transfer in or out of the wheelchair, every precaution should be taken to reduce the gap distance. Turn both casters parallel to the object you are transferring onto. Also be certain the power is Off and wheel locks are engaged to prevent the wheels from moving.

DO NOT adjust the rear seat posts higher than the front seat posts.

Before performing any maintenance, adjustment or service verify that On/Off switch on the joystick is in the Off position.

ALWAYS wear your seat positioning strap. The seat positioning strap is a positioning belt only. It is not designed for use as a safety device withstanding high stress loads such as auto or aircraft safety belts. If signs of wear appear, belt must be replaced IMMEDIATELY.

Avoid storing or using the wheelchair near open flame or combustible products. Serious injury or damage to property may result.

Batteries

The warranty and performance specifications contained in this manual are based on the use of deep cycle gel cell batteries. Invacare strongly recommends their use as the power source for this unit.

Carefully read battery/battery charger information prior to installing, servicing or operating your wheelchair.

DO NOT remove fuse or mounting hardware from POSITIVE (+) RED battery cable/ mounting screw.

All battery terminal covers (two on the front battery and two on the rear battery) MUST be installed prior to use.

The use of rubber gloves is recommended when working with batteries.

Some battery manufacturers mold a carrying strap and/or hold down flanges directly into the battery case. Batteries that interfere with the battery box cannot be used for these applications. Attempting to "wedge" a battery into a battery box may damage the box, the battery and/or be a fire hazard, resulting in serious injury or further damage to property.

Charging Batteries

⚠ DANGER

When using an extension cord, use only a three wire extension cord having at least 16 AWG (American Wire Gauge) wire and the same or higher electrical rating as the devise being connected. Use of improper extension cord could result in a risk of fire and electric shock. Three prong to two prong adapters should not be used. Use of three prong adapters can result in improper grounding and present a shock hazard to the user.

NEVER attempt to recharge the batteries by attaching cables directly to the battery terminals.

DO NOT attempt to recharge the batteries and operate the wheelchair at the same time.

DO NOT operate wheelchair with extension cord attached to the AC cable.

DO NOT attempt to recharge the batteries when the wheelchair has been exposed to ANY type of moisture.

DO NOT attempt to recharge the batteries when the wheelchair is outside.

DO NOT sit in the wheelchair while charging the batteries.

DO NOT attempt to recharge batteries using BOTH the on-board battery charger and an independent battery charger (plugged into the joystick charger port) at the SAME time. Doing so will reduce the life of the batteries.

READ and CAREFULLY follow the manufacturer's instructions for each charger (supplied or purchased). If charging instructions are not supplied, consult a qualified technician for proper procedures.

AFTER charging batteries, ALWAYS make sure that the battery charger cord is securely wrapped and stored within the hook and loop strap assembly on the rear of the battery tray. Failure to do so may result in damage to the cord or personal injury to the user or bystanders.

Ensure the pins of the extension cord plug are the same number, size, and shape as those on the charger.

DO NOT under any circumstances cut or remove the round grounding plug from the charger AC cable plug or the extension cord plug.

Grounding Instructions

DO NOT, under any circumstances, cut or remove the round grounding prong from any plug used with or for Invacare products. Some devices are equipped with three-prong (grounding) plugs for protection against possible shock hazards and fire. Where a two-prong wall receptacle is encountered, it is the personal responsibility and obligation of the customer to contact a qualified electrician and have the two-prong receptacle replaced with a properly grounded three-prong wall receptacle in accordance with the National Electrical Code. If you must use an extension cord, use ONLY a three-wire extension cord having the same or higher electrical rating as the device being connected. In addition, Invacare has placed RED/ORANGE warning tags on some equipment. DO NOT remove these tags.

Rain Test

Invacare has tested its power wheelchairs in accordance with ISO 7176 "Rain Test." This provides the end user or his/her assistant sufficient time to remove his/her power wheelchair from a rain storm and retain wheelchair operation.

DO NOT leave power wheelchair in a rain storm of any kind.

DO NOT use power wheelchair in a shower.

DO NOT store power wheelchair in a damp area for an extended period of time.

Direct exposure to excessive rain or dampness may cause the wheelchair to malfunction electrically and mechanically, may cause the wheelchair to prematurely rust or may damage the upholstery.

Check to ensure that the RED and BLACK battery terminal caps are secured in place, joystick boot is NOT torn or cracked where water can enter and that all electrical connections are secure at all times.

DO NOT use the wheelchair if the joystick boot is torn or cracked. If the joystick boot becomes torn or cracked, replace IMMEDIATELY.

Weight Training

Invacare DOES NOT recommend the use of its wheelchairs as a weight training apparatus. Invacare wheelchairs have NOT been designed or tested as a seat for any kind of weight training. If occupant uses said wheelchair as a weight training apparatus, Invacare shall NOT be liable for bodily injury and the warranty is void.

Weight Limitation

The Pronto M91 wheelchairs have the following weight limitations:

MODEL	WEIGHT LIMITATION
STANDARD	300 lb
HEAVY DUTY	400 lb

SECTION 2—EMI INFORMATION

⚠ WARNING

CAUTION: IT IS VERY IMPORTANT THAT YOU READ THIS INFORMATION REGARDING THE POSSIBLE EFFECTS OF ELECTROMAGNETIC INTERFERENCE ON YOUR POWERED WHEELCHAIR.

Electromagnetic Interference (EMI) From Radio Wave Sources

Powered wheelchairs and motorized scooters (in this text, both will be referred to as powered wheelchairs) may be susceptible to electromagnetic interference (EMI), which is interfering electromagnetic energy (EM) emitted from sources such as radio stations, TV stations, amateur radio (HAM) transmitters, two way radios, and cellular phones. The interference (from radio wave sources) can cause the powered wheelchair to release its brakes, move by itself, or move in unintended directions. It can also permanently damage the powered wheelchair's control system. The intensity of the interfering EM energy can be measured in volts per meter (V/m). Each powered wheelchair can resist EMI up to a certain intensity. This is called its "immunity level." The higher the immunity level, the greater the protection. At this time, current technology is capable of achieving at least a 20 V/m immunity level, which would provide useful protection from the more common sources of radiated EMI.

There are a number of sources of relatively intense electromagnetic fields in the everyday environment. Some of these sources are obvious and easy to avoid. Others are not apparent and exposure is unavoidable. However, we believe that by following the warnings listed below, your risk to EMI will be minimized.

The sources of radiated EMI can be broadly classified into three types:

1) **Hand-held Portable transceivers (transmitters-receivers with the antenna mounted directly on the transmitting unit. Examples include: citizens band (CB) radios, "walkie talkie", security, fire and police transceivers, cellular telephones, and other personal communication devices).**

NOTE: Some cellular telephones and similar devices transmit signals while they are ON, even when not being used.

2) **Medium-range mobile transceivers, such as those used in police cars, fire trucks, ambulances and taxis. These usually have the antenna mounted on the outside of the vehicle; and**

3) **Long-range transmitters and transceivers, such as commercial broadcast transmitters (radio and TV broadcast antenna towers) and amateur (HAM) radios.**

NOTE: Other types of hand-held devices, such as cordless phones, laptop computers, AM/FM radios, TV sets, CD players, cassette players, and small appliances, such as electric shavers and hair dryers, so far as we know, are not likely to cause EMI problems to your powered wheelchair.

⚠ WARNING

Powered Wheelchair Electromagnetic Interference (EMI)

Because EM energy rapidly becomes more intense as one moves closer to the transmitting antenna (source), the EM fields from hand-held radio wave sources (transceivers) are of special concern. It is possible to unintentionally bring high levels of EM energy very close to the powered wheelchair's control system while using these devices. This can affect powered wheelchair movement and braking. Therefore, the warnings listed below are recommended to prevent possible interference with the control system of the powered wheelchair.

Electromagnetic interference (EMI) from sources such as radio and TV stations, amateur radio (HAM) transmitters, two-way radios, and cellular phones can affect powered wheelchairs and motorized scooters.

FOLLOWING THE WARNINGS LISTED BELOW SHOULD REDUCE THE CHANCE OF UNINTENDED BRAKE RELEASE OR POWERED WHEELCHAIR MOVEMENT WHICH COULD RESULT IN SERIOUS INJURY.

1) **Do not operate hand-held transceivers (transmitters receivers), such as citizens band (CB) radios, or turn ON personal communication devices, such as cellular phones, while the powered wheelchair is turned ON;**
2) **Be aware of nearby transmitters, such as radio or TV stations, and try to avoid coming close to them;**
3) **If unintended movement or brake release occurs, turn the powered wheelchair OFF as soon as it is safe;**
4) **Be aware that adding accessories or components, or modifying the powered wheelchair, may make it more susceptible to EMI (NOTE: There is no easy way to evaluate their effect on the overall immunity of the powered wheelchair); and**
5) **Report all incidents of unintended movement or brake release to the powered wheelchair manufacturer, and note whether there is a source of EMI nearby.**

Important Information

1) **20 volts per meter (V/m) is a generally achievable and useful immunity level against EMI (as of May 1994) (the higher the level, the greater the protection);**
2) **This device has been tested to a radiated immunity level of 20 volts per meter;**
3) **The immunity level of the product is unknown.**

Modification of any kind to the electronics of this wheelchair as manufactured by Invacare may adversely affect the EMI immunity levels.

SECTION 3—SAFETY/HANDLING OF WHEELCHAIRS

"Safety and Handling" of the wheelchair requires the close attention of the wheelchair user as well as the assistant. This manual points out the most common procedures and techniques involved in the safe operation and maintenance of the wheelchair. It is important to practice and master these safe techniques until you are comfortable in maneuvering around the frequently encountered architectural barriers.

Use this information only as a "basic" guide. The techniques that are discussed on the following pages have been used successfully by many.

Individual wheelchair users often develop skills to deal with daily living activities that may differ from those described in this manual. Invacare recognizes and encourages each individual to try what works best for him/her in overcoming architectural obstacles that they may encounter, however ALL WARNINGS and CAUTIONS given in this manual MUST be followed. Techniques in this manual are a starting point for the new wheelchair user and assistant with "safety" as the most important consideration for all.

Stability and Balance

⚠ WARNING

ALWAYS wear your seat positioning strap. The seat positioning strap is a positioning belt ONLY. It is not designed for use as a safety device withstanding high stress loads such as auto or aircraft safety belts. If signs of wear appear, belt must be replaced IMMEDIATELY.

DO NOT climb, go up or down ramps or traverse slopes greater than 9°.

Invacare strongly recommends proceeding down ramps or slopes at half speed or slower and to avoid hard braking or sudden stops.

DO NOT leave elevating legrests in the fully extended position when proceeding down ramps or slopes.

Proper positioning is essential for your safety. When reaching, leaning, bending or bending forward, it is important to use the casters as a tool to maintain stability and balance.

DO NOT attempt to reach objects if you have to move forward in the seat or pick them up from the floor by reaching down between your knees.

Be aware that carrying heavy objects on your lap while occupying the wheelchair may adversely affect the stability of the wheelchair, resulting in serious bodily injury to the user, damage to the wheelchair and surrounding property.

This wheelchair has been designed to accommodate one individual. If more than one individual occupies the wheelchair this may adversely affect the stability of the wheelchair, resulting in serious bodily injury to the user and passenger and damage to the wheelchair and surrounding property.

⚠ WARNING

Many activities require the wheelchair user to reach, bend and transfer in and out of the wheelchair. These movements will cause a change to the normal balance, center of gravity, and weight distribution of the wheelchair. To determine and establish your particular safety limits, practice bending, reaching and transferring activities in several combinations in the presence of a qualified healthcare professional before attempting active use of the wheelchair.

The Pronto M91 wheelchairs have the following weight limitations:

MODEL	WEIGHT LIMITATION
STANDARD	300 lb
HEAVY DUTY	400 lb

To assure stability and proper operation of your wheelchair, you must at all times maintain proper balance. Your wheelchair has been designed to remain upright and stable during normal daily activities as long as you DO NOT move beyond the center of gravity. DO NOT lean forward out of the wheelchair any further than the length of the armrests.

Coping With Everyday Obstacles

NOTE: For this procedure, refer to FIGURE 3.1.

Coping with the irritation of everyday obstacles can be alleviated somewhat by learning how to manage your wheelchair. Keep in mind your center of gravity to maintain stability and balance.

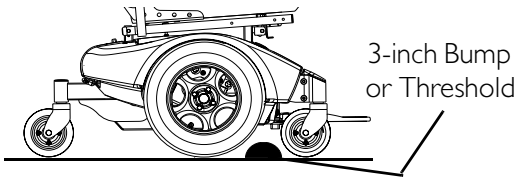


FIGURE 3.1 Coping With Everyday Obstacles

While the walking beam allows to traverse up to a 3-inch bump or threshold, stopping after the wheels cross the bump poses a problem. The wheelchair cannot reverse over the bump at this point. Continue forward and then turn around.

While the M91 is designed for use primarily in and around the home, the provider should determine whether this wheelchair is suitable for the actual environment the wheelchair will be used in.

DO NOT go down ramp at full speed. Some seat/back positions will cause wheelchair to feel unstable.

CAUTION

Be aware of condition of ramp. Traction will be diminished/nonexistent on a slippery surface. Proceed with caution.

Pinch Points

⚠ WARNING

Pinch point may occur when returning the tilted seat to the full upright position. Make sure the hands and body of the occupant, attendants and bystanders are clear of all pinch points before lowering seat (FIGURE 3.2).

DO NOT store or place items under the seat.

NOTE: For this procedure, refer to FIGURE 3.2 and FIGURE 3.3.

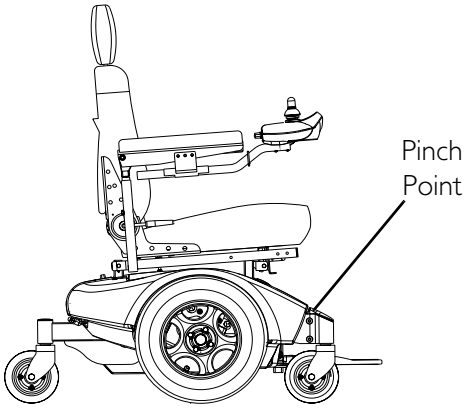


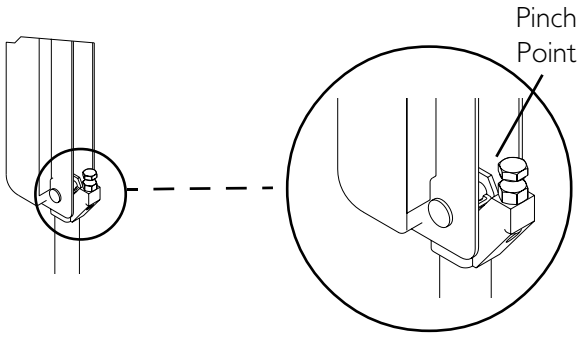
FIGURE 3.2 Pinch Points

⚠ WARNING

Pinch point may occur when adjusting the arm angle position (Detail "A").

Pinch point may occur when rotating the footboard assembly (Detail "B").

DETAIL "A"



DETAIL "B"

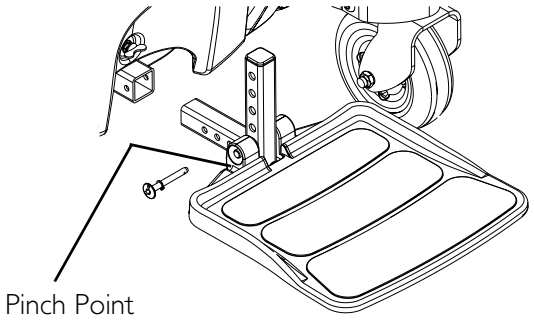


FIGURE 3.3 Pinch Points

A Note to Wheelchair Assistants

When assistance to the wheelchair user is required, remember to use good body mechanics. Keep your back straight and bend your knees whenever tilting wheelchair or traversing curbs or other impediments.

Also, be aware of detachable parts such as arms or legrests. These must NEVER be used to move the wheelchair or as lifting supports, as they may be inadvertently released, resulting in possible injury to the user and/or assistant(s).

When learning a new assistance technique, have an experienced assistant help you before attempting it alone.

Lifting/Stairways

⚠ WARNING

DO NOT attempt to move an occupied power wheelchair between floors using a stairway. Use an elevator to move an occupied power wheelchair between floors. If moving a power wheelchair between floors by means of a stairway, the occupant MUST be removed and transported independently of the power wheelchair.

Extreme caution is advised when it is necessary to move an unoccupied power wheelchair up or down the stairs. Invacare recommends using two assistants and making thorough preparations.

Use ONLY secure, nondetachable parts for hand-hold supports.

It is strongly recommended to lift the wheelchair only by the rear frame and the front forks - otherwise injury or damage may occur.

DO NOT attempt to lift the wheelchair by any removable (detachable) parts. Lifting by means of any removable (detachable) parts of a wheelchair may result in injury to the user or damage to the wheelchair.

The weight of the wheelchair with batteries and without the user is between 203 and 318 lbs. Use proper lifting techniques (lift with your legs) to avoid injury.

NOTE: For this procedure, refer to FIGURE 3.4.

Follow this procedure for moving the wheelchair between floors when an elevator is NOT available or lifting the wheelchair is necessary:

1. Remove the occupant from the wheelchair.
2. Bend your knees and keep your back straight.
3. Using the rear frame and the front edge of the front forks as hand hold supports, transfer the wheelchair base to the desired location.

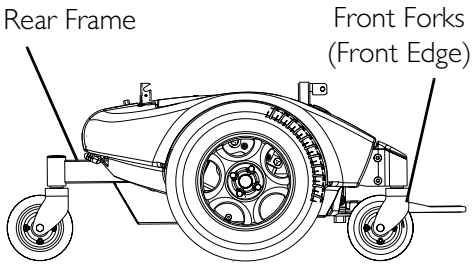


FIGURE 3.4 Lifting/Stairways - Hand Hold Supports

⚠ WARNING: ESCALATORS

DO NOT use an escalator to move a wheelchair between floors. Serious bodily injury may occur.

Transferring To and From Other Seats

⚠ WARNING

ALWAYS turn the wheelchair power Off and engage the Motor Release Levers to prevent the wheels from moving before attempting to transfer in or out of the wheelchair. Also, make sure every precaution is taken to reduce the gap distance by aligning both the front and rear casters parallel with the object you are transferring onto.

CAUTION

When transferring, position yourself as far back as possible in the seat. This will prevent broken screws, damaged upholstery and the possibility of the wheelchair tipping forward.

NOTE: For this procedure, refer to FIGURE 3.5.

NOTE: This activity may be performed independently provided you have adequate mobility and upper body strength.

FIGURE 3.5 Transferring To and From Other Seats

1. Position the wheelchair as close as possible along side the seat to which you are transferring, with the rear casters pointing away from it.
2. After the wheelchair is positioned properly for transfer, verify that the Motor Release Levers are engaged. Refer to Engaging/Disengaging Motor Release Lever on page 57.
3. Flip back or remove arm on side of wheelchair you are transferring from.
4. Shift body weight into seat with transfer.

⚠ WARNING

During independent transfer, little or no seat platform will be beneath you. Use a transfer board if at all possible.

Reaching, Leaning and Bending - Forward

⚠ WARNING

DO NOT attempt to reach objects if you have to move forward in the seat or pick them up from the floor by reaching down between your knees.

NOTE: For this procedure, refer to FIGURE 3.6.

Position the front and rear casters so that they are extended as far forward as possible and engage Motor Release Levers.

FIGURE 3.6 Reaching, Leaning and Bending - Forward

Reaching and Bending - Backward

⚠ WARNING

DO NOT lean over the top of the back upholstery. This will change your center of gravity and may cause you to tip over.

NOTE: For this procedure, refer to FIGURE 3.7.

Position wheelchair as close as possible to the desired object. Point the front and rear casters rearward to create the longest possible wheelbase. Reach back only as far as your arm will extend without changing your sitting position.

FIGURE 3.7 Reaching and Bending - Backward

SECTION 4—SAFETY INSPECTION/ TROUBLESHOOTING

NOTE: Every six months or as necessary take your wheelchair to a qualified dealer for a thorough inspection and servicing. Regular cleaning will reveal loose or worn parts and enhance the smooth operation of your wheelchair. To operate properly and safely, your wheelchair must be cared for just like any other vehicle. Routine maintenance will extend the life and efficiency of your wheelchair.

Safety Inspection Checklists

CAUTION

As with any vehicle, wheels and tires should be checked periodically for cracks and wear and should be replaced as necessary.

Initial adjustments should be made to suit your personal body structure needs and preference. Thereafter follow these maintenance procedures:

Inspect/Adjust Initially

- ❑ Ensure wheelchair rolls straight (no excessive drag or pull to one side).
- ❑ Ensure arms are secure but easy to release and adjustment levers engage properly (on ASBA only).
- ❑ Ensure adjustable height arms operate and lock securely.
- ❑ Ensure armrest pads sit flush against arm tubes.
- ❑ Ensure seat is secured to wheelchair frame.
- ❑ Ensure seat release latch is functional. Replace if necessary.
- ❑ Ensure wheel mounting nuts are secure on drive wheels.
- ❑ Ensure there is no excessive side movement or binding when drive wheels are lifted and spun when disengaged (freewheeling).
- ❑ Ensure wheel/fork assembly has proper tension when caster is spun. Caster should come to a gradual stop.
- ❑ Loosen/tighten caster locknut if wheel wobbles noticeably or binds to a stop.
- ❑ Ensure all caster/wheel/fork/headtube fasteners are secure.
- ❑ Inspect tires for flat spots and wear.
- ❑ Inspect and clean the stability lock gears.
- ❑ Clean upholstery and armrests.
- ❑ Check that all labels are present and legible. Replace if necessary.
- ❑ Ensure casters are free of debris.

Inspect/Adjust Weekly

- ❑ Ensure seat is secured to wheelchair frame.
- ❑ Ensure seat and/or back upholstery have no rips and do not sag. Replace if necessary.
- ❑ Ensure seat release latch is not worn and is functional. Replace if necessary.
- ❑ Inspect tires for flat spots and wear.
- ❑ Ensure arm pivot points are not worn and/or loose. Replace if necessary.
- ❑ Inspect and clean the stability lock gears. Replace if worn.
- ❑ Ensure casters are free of debris.

Inspect/Adjust Monthly

- ❑ Ensure wheel mounting nuts are secure on drive wheels.
- ❑ Ensure there is no excessive side movement or binding when drive wheels are lifted and spun when disengaged (free-wheeling).
- ❑ Ensure wheel/fork assembly has proper tension when caster is spun. Caster should come to a gradual stop.
- ❑ Loosen/tighten caster locknut if wheel wobbles noticeably or binds to a stop.
- ❑ Ensure all caster/wheel/fork/headtube fasteners are secure.
- ❑ Inspect for any loose hardware on the wheelchair.
- ❑ Inspect the seat positioning strap for signs of wear. Replace if worn or damaged.
- ❑ Ensure that the buckle on the seat positioning strap latches. Replace if necessary.
- ❑ Verify that the hardware that attaches the seat positioning strap to the seat frame is secure and undamaged. Replace if necessary.
- ❑ Ensure casters are free of debris.

Inspect/Adjust Periodically

- ❑ Ensure wheelchair rolls straight (no excessive drag or pull to one side).
- ❑ Ensure that casters are free of debris.
- ❑ Ensure arms are secure but easy to release and adjustment levers engage properly (on ASBA only).
- ❑ Ensure adjustable height arms operate and lock securely.
- ❑ Ensure arm pivot points are not worn and/or loose. Replace if necessary.
- ❑ Ensure armrest pads sit flush against arm tubes.
- ❑ Ensure seat and/or back upholstery have no rips and do not sag. Replace if necessary.
- ❑ Inspect electrical components for signs of corrosion. Replace if corroded or damaged.
- ❑ Ensure seat release latch is not worn. Replace if necessary.

- ❑ Inspect and clean the stability lock gears. Replace if worn.
- ❑ Clean upholstery and armrests.
- ❑ Inspect charger AC power cord for damage. Replace if necessary.
- ❑ Check that wiring is routed and secured properly to ensure that wiring does NOT become entangled and damaged.
- ❑ Inspect electrical components for signs of corrosion. Replace if corroded or damaged.
- ❑ Check that all labels are present and legible. Replace if necessary.

Troubleshooting Guide

SYMPTOM	PROBABLE CAUSE	SOLUTIONS
Batteries draw excessive current when charging.	Battery failure. Electrical malfunction.	Have batteries checked for shorted cell. Replace if necessary. Contact Dealer/Invacare for service.
Battery indicator flashes the charge level is low - IMMEDIATELY after recharge.	Battery failure. Malfunctioning battery charger. Electrical malfunction	Check batteries for shorted cell. Replace if necessary. Contact Dealer/Invacare for service. Contact Dealer/Invacare for service.
Battery indicator flashes the charge level is low - too soon after being recharged.	Batteries not charged. Weak batteries	Have charger checked. Replace batteries if necessary. Contact Dealer/ Invacare for service.
Motor "chatters" or runs irregular.	Electrical malfunction.	Contact Dealer/Invacare for service.
Only one drive wheel turns.	Electrical malfunction. One motor lock is disen-gaged.	Contact Dealer/Invacare for service. Engage motor lock.
Joystick erratic or does not respond as desired.	Damaged motor coupling. Electrical malfunction. Controller programmed improperly.	Contact Dealer/Invacare for service. Contact Dealer/Invacare for service. Reprogram controller (Refer to MK_5™ EX™ or MK_5 NX™ electronics owner's manual supplied with wheelchair).
Wheelchair does not respond to commands.	Poor battery terminal connection.	Have terminals cleaned.
Power indicator off - even after recharging.	Electrical malfunction.	Contact Dealer/Invacare for service.

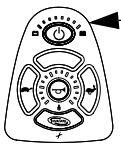
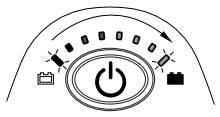
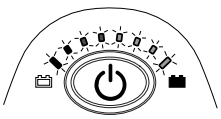
NOTE: For additional troubleshooting information and explanation of error codes, refer to the Electronics Manual supplied with each wheelchair.

Troubleshooting - Electrical

NOTE: For additional troubleshooting information and explanation of error codes, refer to the individual Electronics Manual supplied with each wheelchair

The joystick information gauge and the service indicator give indications of the type of fault or error detected by the control module. When a fault is detected, the wheelchair may stop and not drive. The LEDs on the information gauge may flash in a particular pattern or the service indicator light will flash. The number or type of flashes indicates the nature of the error. If multiple errors are found, only the first error encountered by the control module will be displayed.

Information Gauge Display Diagnostics

DISPLAY 	DESCRIPTION	DEFINITION	COMMENTS
	All LEDs are off.	Power is off.	
	All LEDs are on.	Power is on.	Fewer than three LEDs on implies reduced battery charge.
	Left RED LED is flashing.	Battery charge is low.	The batteries should be charged as soon as possible.
	Left to Right “chase” alternating with steady display.	Joystick is in programming, inhibit and/or charging mode.	The steady LEDs indicate the current state of the battery charge.
	All LEDs are flashing slowly.	Joystick has detected Out-of-Neutral-at-Power-Up mode.	Release the joystick back to Neutral.

Service Indicator Light Diagnostics

NUMBER OF FLASHES	ERROR CODE DESCRIPTION	POSSIBLE SOLUTION
1	User Fault	Release joystick to neutral and try again.
2	Battery Fault	Charge the batteries. Refer to Charging Batteries on page 64. Check that battery cables are connected properly. Refer to Connecting/Disconnecting the Battery Wiring Harness on page 62. If necessary, replace batteries. Refer to Charging Batteries on page 64.

NUMBER OF FLASHES	ERROR CODE DESCRIPTION	POSSIBLE SOLUTION
3	Left Motor Fault	Contact Invacare/Dealer for service.
4	Right Motor Fault	Contact Invacare/Dealer for service.
5	Left Park Brake Fault	Contact Invacare/Dealer for service.
6	Right Park Brake Fault	Contact Invacare/Dealer for service.
7	Remote Fault	Check to make sure joystick is connected properly. Contact Invacare/Dealer for service.
8	Controller Fault	Contact Invacare/Dealer for service.
9	Communications Fault	Contact Invacare/Dealer for service.
10	General Fault	Contact Invacare/Dealer for service.
11	Incompatible or incorrect Remote	Wrong type of remote connected. Contact Invacare/Dealer for service.

Checking Battery Charge Level

The following "Do's" and "Don'ts" are provided for your convenience and safety.

DON'T	DO
Don't perform any installation or maintenance without first reading this manual.	Read and understand this manual and any service information that accompanies a battery and charger before operating the wheelchair.
Don't perform installation or maintenance of batteries in an area that could be damaged by battery spills.	Move the wheelchair to a work area before cleaning terminals, or opening battery box.
Don't make it a habit to discharge batteries to the lowest level.	Recharge as frequently as possible to maintain a high charge level and extend battery life.
Don't use randomly chosen batteries or chargers.	Follow recommendations in this manual when selecting a battery or charger.
Don't put new batteries into service before charging.	Fully charge a new battery before using.
Don't tip or tilt batteries.	Use a carrying strap to remove, move or install a battery.
Don't tap on clamps and terminals with tools.	Push battery clamps on the terminals. Spread clamps wider if necessary.
Don't mismatch your battery and chargers.	Use ONLY a GEL charger for a GEL battery.

SECTION 5—WHEELCHAIR OPERATION

⚠ WARNING

After ANY adjustments, repair or service and before use, make sure that all attaching hardware is tightened securely - otherwise injury or damage may result.

Set-up of the Electronic Control Unit is to be performed only by a qualified technician. The final adjustments of the controller may affect other activities of the wheelchair. Damage to the equipment could occur if improperly setup or adjusted.

Operating the Wheelchair

Turning the Power On/Off

NOTE: For this procedure, refer to FIGURE 5.1.

1. To turn the power on, press the On/Off button.
2. Turning the power off, press the On/Off button.

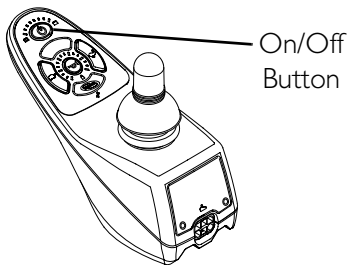


FIGURE 5.1 Turning the Power On/Off

On/Off Button

This button is located at the front of the joystick housing. It is used to turn the wheelchair on and off, to remove the joystick from sleep mode (if programmed) and to lock or unlock the joystick (if programmed).

Using the Joystick to Drive the Wheelchair

The joystick is located at the front of the joystick housing and provides smooth control of speed and direction. It is equipped with 360 degrees of mobility for ease of operation. The joystick is spring-loaded, and automatically returns to the upright (neutral) position when released. Pushing the joystick in a given direction causes the wheelchair to move in that direction.

The joystick has proportional drive control, meaning that the further it is pushed from the upright (neutral) position, the faster the wheelchair moves. The maximum speed, however, is limited by the setting of the speed-control knob.

To slow the wheelchair to a stop, simply release the joystick. The wheelchair has automatic speed and direction compensation to minimize corrections.

When first learning to drive, select a slow speed and try to drive the wheelchair as slowly as possible by pushing the joystick slightly forward. This exercise will help you learn to utilize the full potential of the proportional control and allow you to start and stop smoothly.

To drive the wheelchair, perform the following:

1. Adjust speed. Refer to Speed Control Buttons on page 33.
2. Turn the power On. Refer to Turning the Power On/Off on page 31.
3. Maneuver the joystick in the following manner:

MOVEMENT	ACTION
FORWARD	Push forward on the joystick.
REVERSE	Pull back on the joystick.
Turn RIGHT	Move the joystick RIGHT.
Turn LEFT	Move the joystick LEFT.
STOP	Release the joystick and the wheelchair will quickly slow down.

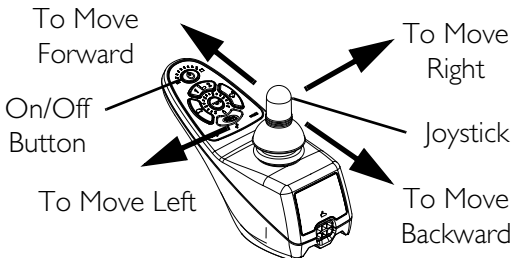


FIGURE 5.2 Operating the Wheelchair

SPJ™ + Joystick Switches and Indicators

NOTE: For the following information, refer to FIGURE 5.3.

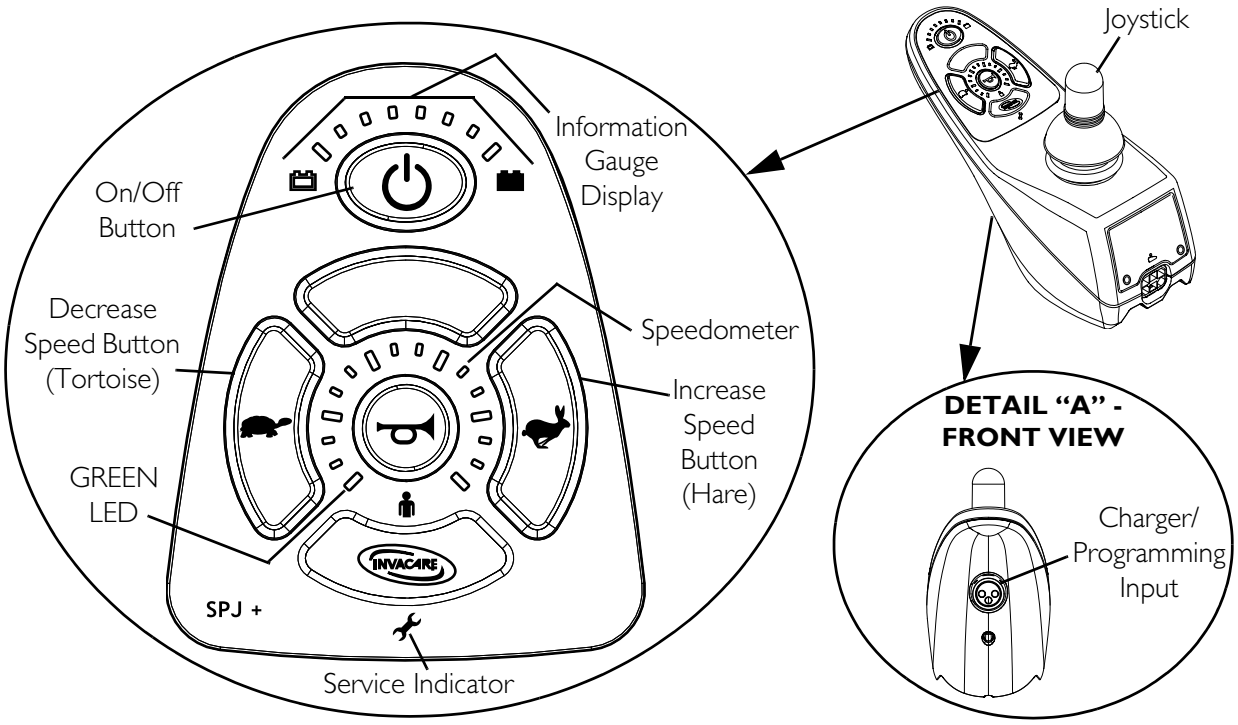


FIGURE 5.3 SPJ™ + Joystick Switches and Indicators

On/Off Button

This button is located at the front of the joystick housing. It is used to turn the wheelchair On and Off, to remove the joystick from sleep mode (if programmed) and to lock or unlock the joystick (if programmed).

Speedometer

The speedometer is used to show the maximum speed. The right-most LED indicates current maximum speed setting. The bottom left GREEN LED flashes to indicate that the joystick is in speed limit mode. Speed limit mode limits the drive speed to a pre-programmed value, typically when the seat has been elevated and the wheelchair is required to drive at 20% speed.

Speed Control Buttons

The speed control buttons (tortoise button ( ) and hare button ( )) are used to set and adjust the maximum speed.

1. To adjust the speed, perform one of the following:
   - Adjust Speed in 20% Increments (5 Speed Mode) - Press the tortoise button ( ) or hare button ( ) to decrease/increase the speed in 20% increments. The larger bars in the speedometer will light.

- Adjust Speed in Smaller Increments (VSP Mode) - Perform the following steps:
  i. Press and hold both the tortoise button ( ) and hare button ( ) until the joystick beeps.
  ii. Perform one of the following:
    - Press the tortoise button ( ) or hare button ( ) to decrease/increase the speed in 20% increments. The larger bars in the speedometer will light.
    - Press and hold the tortoise button ( ) or hare button ( ) to decrease/increase the speed in smaller increments. The smaller bars in the speedometer will light.

Joystick

The joystick has proportional drive control, meaning that further the joystick is pushed from the upright (neutral) position, the faster the wheelchair or seat moves. Your top speed, however, is limited by the programmed settings.

To slow the wheelchair to a stop, simply release the joystick. The wheelchair has automatic speed and direction compensation to minimize corrections.

Charger/Programming Input

The charger/programming input is located at the front of the joystick housing. This provides easy access for charging the wheelchair batteries. This port also serves as the Remote Programmer Communication connection. Driving is prevented while the system is charging.

Service Indicator

The AMBER service indicator will light when an error or fault occurs. A chart of the diagnostic indications is given in Diagnostic Code of the electronics manual supplied with the wheelchair.

Information Gauge Display

Located on the front of the joystick housing, it provides the following information to the user on the status of the wheelchair -

1. Power is On.
2. True state-of-battery-charge, including notification of when the battery requires charging:
   A. Green LEDs are lit, indicating well charged batteries.
   B. Amber LEDs are lit, indicating batteries are moderately charged. Recharge batteries before taking a long trip.
   C. Red LEDs are lit, indicating batteries are running out of charge. Recharge batteries as soon as possible.

The Information Gauge display also serves as a system diagnostic device when a fault is detected by the control module. A specific number of flashes of the LEDs indicate the type of fault detected. Refer to Troubleshooting Guide on page 28 for the diagnostic indications of the wheelchair status.

SECTION 6—ARMS

⚠ WARNING

After ANY adjustments, repair or service and before use, make sure that all attaching hardware is tightened securely - otherwise injury or damage may result.

Before performing any maintenance, adjustment or service verify that On/Off switch on the joystick is in the Off position.

Adjusting Van Seat Armrests

⚠ WARNING

Pinch point may occur when adjusting the arm angle position (Detail "A").

Angle

NOTE: For this procedure, refer to Detail "A" of FIGURE 6.1.

1. Lift up the armrest.
2. Loosen the jam nut.
3. Adjust the socket screw up or down to the desired arm angle position.
4. Tighten the jam nut.
5. To determine the same angle for the opposite armrest, count the exposed threads after the jam nut has been tightened.
6. Repeat STEPS 1-4 for opposite armrest, if necessary.

Height

NOTE: For this procedure, refer to Detail "B" of FIGURE 6.1.

1. Remove the socket screw that secures the armrest to the seat frame assembly.
2. Adjust the armrest to one of four positions.
3. Reinstall the socket screw that secures the armrest to the seat frame assembly and tighten securely.

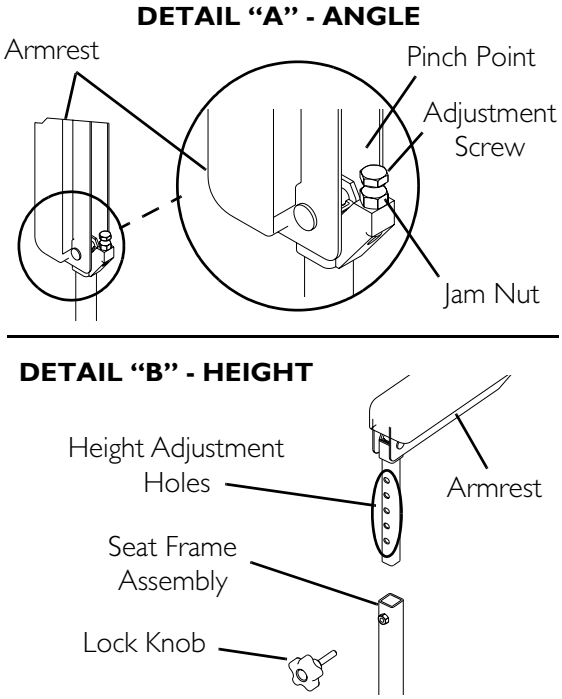


FIGURE 6.1 Adjusting Van Seat Armrests

SECTION 7—SEAT

⚠ WARNING

After any adjustments, repair or service and before use, make sure that all attaching hardware is tightened securely - otherwise injury or damage may result.

Before performing any maintenance, adjustment or service verify that On/Off switch on the joystick is in the Off position.

Adjusting the Headrest

NOTE: For this procedure, refer to FIGURE 7.1.

1. To raise headrest, lift headrest up to desired position.

NOTE: Headrest is locked in position when an audible "click" is heard.

2. To lower headrest, push release tab towards the inside of the wheelchair. Lower headrest to desired position.

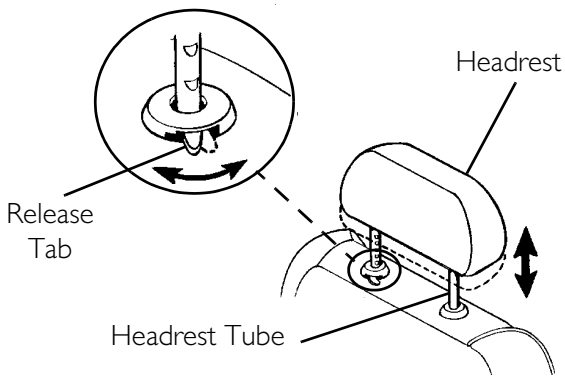


FIGURE 7.1 Adjusting the Headrest

Adjusting the Back Angle

NOTE: For this procedure, refer to FIGURE 7.2.

1. Lift up on the release handle and adjust seat to desired angle.
2. Let go of the release handle to lock the back in position.

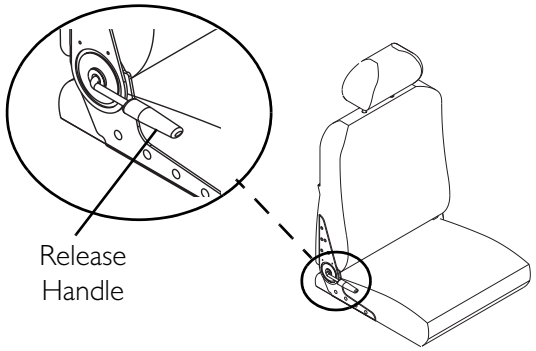


FIGURE 7.2 Adjusting the Back Angle

Removing/Installing the Seat Assembly

⚠ WARNING

DO NOT store items under seat - interference with seat latch may result.

NOTE: For this procedure, refer to FIGURE 7.3 on page 37.

Removing

1. Disconnect the joystick. Refer to Disconnecting/Connecting the MK5 Joysticks on page 69.

2. Push down on the latch bar underneath front of seat.
3. Tilt front edge of seat up.
4. Slide the seat assembly forward to disengage seat from the pivot brackets located in the rear.

Installing

1. Position the seat in the rear pivot brackets as shown in FIGURE 7.3.
2. Tilt front edge of seat down.
3. When seat is lowered, engage seat brackets into seat clevis pins.

⚠ WARNING

When reinstalling the seat verify that the seat brackets are engaged with the seat clevis pins by pulling up on the latch bar.

4. Pull up on latch bar to verify that brackets are engaged with seat clevis pins.
5. Connect the joystick. Refer to Disconnecting/Connecting the MK5 Joysticks on page 69.

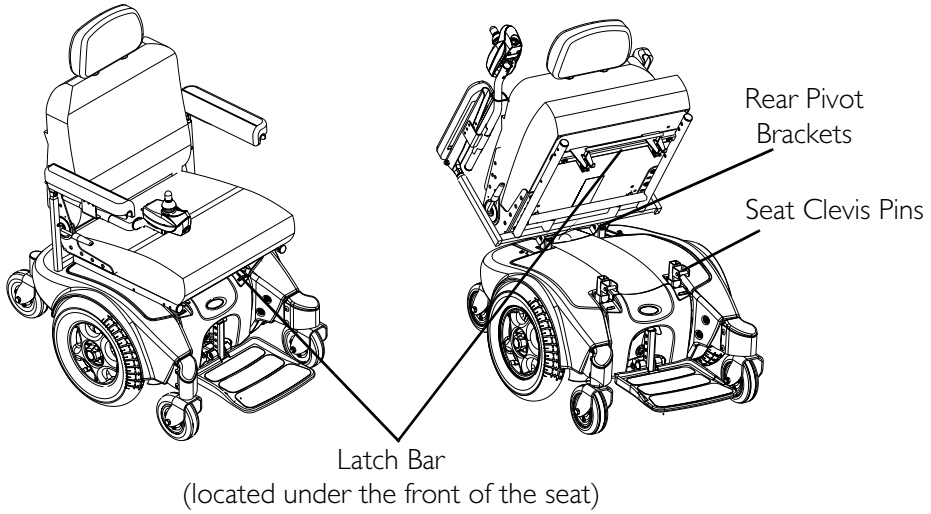


FIGURE 7.3 Removing/Installing the Seat Assembly

Adjusting the Seat Height

NOTE: For this procedure, refer to FIGURE 7.4 on page 38.

NOTE: The seat can be adjusted to five height positions in ½-inch increments.

1. Remove the seat. Refer to Removing/Installing the Seat Assembly on page 36.
2. Remove the mounting screw and locknut that secures the adjustable height tube to the support tube.

3. Adjust tube to desired mounting position. Refer to the following table for available mounting positions.

	AVAILABLE MOUNTING HOLES FOR FRONT ADJUSTABLE HEIGHT TUBE				
WHEELCHAIR IS EQUIPPED WITH	A	B	C	D	E
VAN SEAT WITH FOOTBOARD					
REAR ADJUSTABLE HEIGHT TUBE					
Mounted in hole A	N/A**	✓	✓	✓	✓
Mounted in hole B	N/A*	N/A*	✓	✓	✓
Mounted in hole C	N/A*	N/A*	✓	✓	✓
Mounted in hole D	N/A*	N/A*	N/A*	✓	✓
Mounted in hole E	N/A*	N/A*	N/A*	N/A*	✓

**NOTE: This mounting hole combination would result in a forward seat dump. Forward seat dump is where the rear of the seat is higher than the front of the seat. The seat should never be adjusted to a position that results in a forward seat dump.*

***NOTE: This mounting hole combination cannot be used because it would cause the front riggings of the wheelchair to interfere with other components of the wheelchair.*

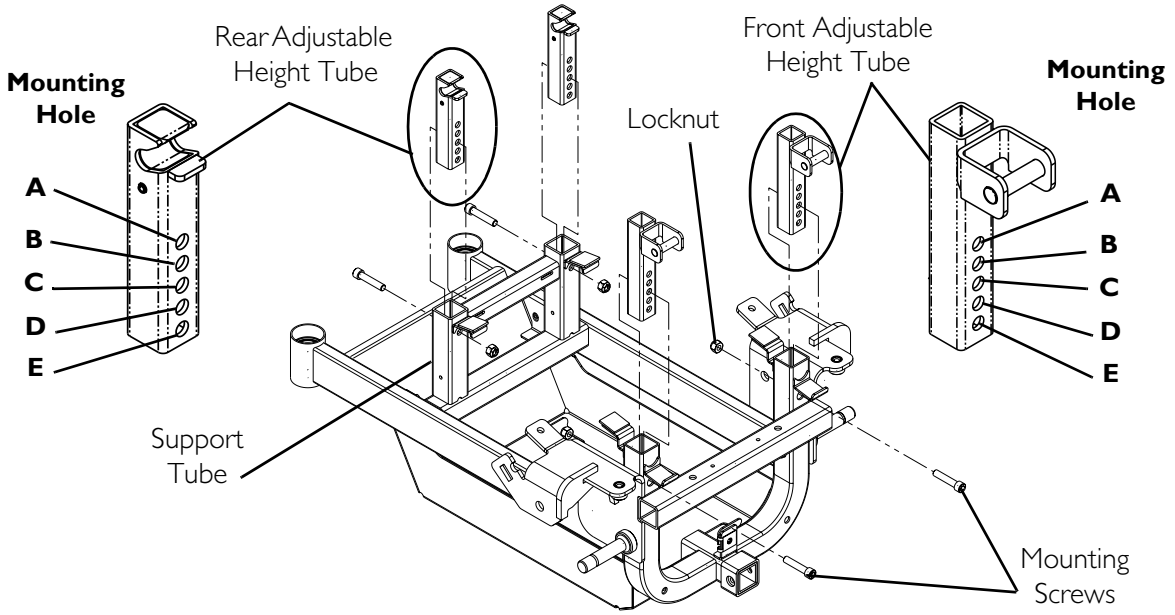


FIGURE 7.4 Adjusting the Seat Height

4. Reinstall mounting screw and locknut (FIGURE 7.4). Securely tighten.
5. Repeat STEPS 2-4 for the three remaining adjustable height tubes.

⚠ WARNING

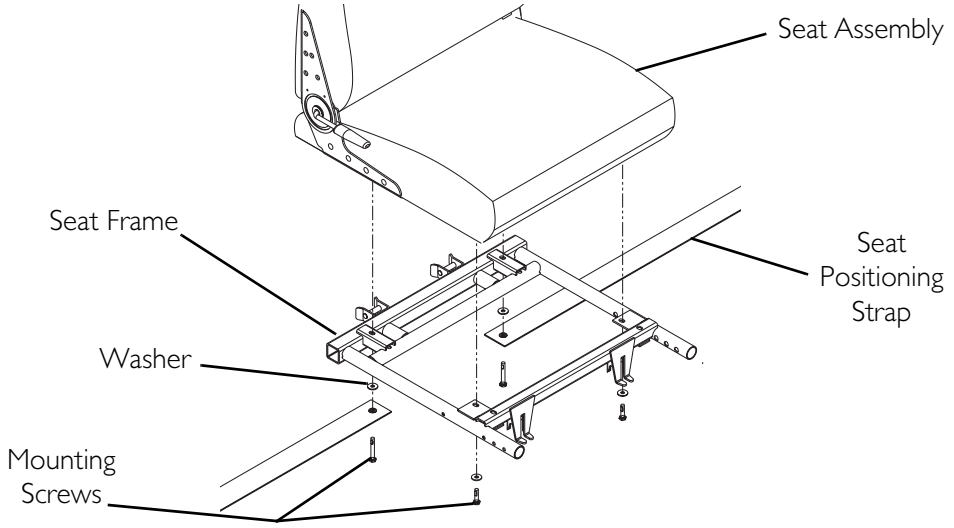
When reinstalling the seat verify that the seat brackets are engaged with the seat clevis pins by pulling up on the latch bar.

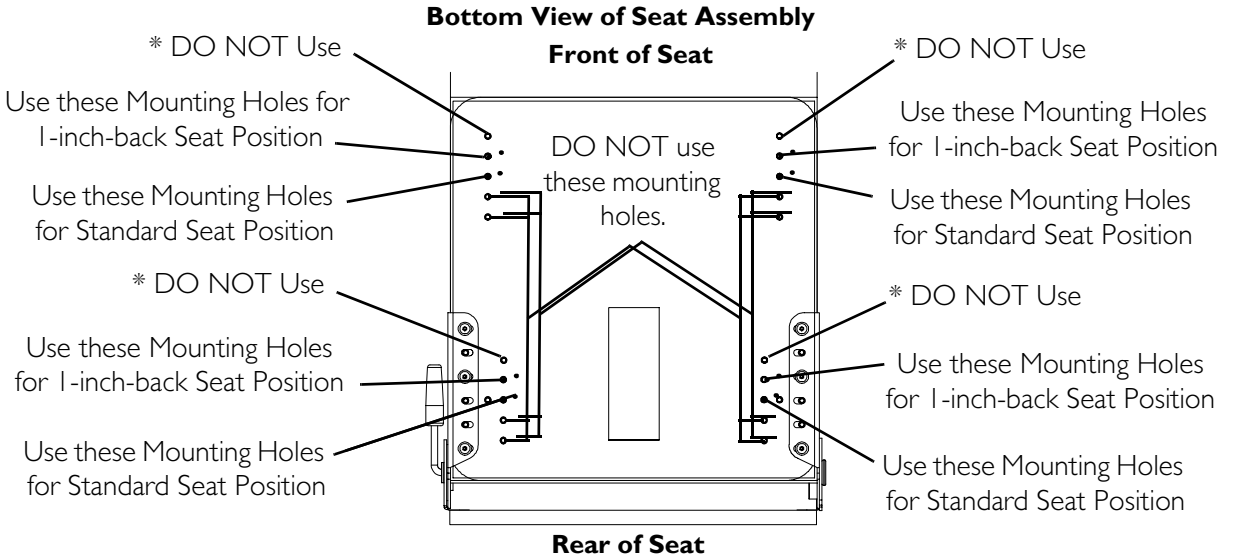
6. Reinstall the seat. Refer to Removing/Installing the Seat Assembly on page 36.

Adjusting Seat Position on Seat Frame

NOTE: For this procedure, refer to FIGURE 7.5 and FIGURE 7.7 on page 41.

1. Remove the seat. Refer to Removing/Installing the Seat Assembly on page 36.
2. Remove the four mounting screws and washers securing the seat assembly to the seat frame (FIGURE 7.5).
3. Separate the seat assembly from the seat frame.
4. Refer to FIGURE 7.7 to determine the correct mounting holes to achieve the desired seat position.
5. Align the seat assembly mounting holes determined in STEP 4 with the seat frame mounting holes determined in STEP 4.
6. Using the four mounting screws and washers, secure the seat assembly to the seat frame. Securely tighten.
7. Reinstall the seat. Refer to Removing/Installing the Seat Assembly on page 36.




Bottom View of Seat Assembly
Front of Seat
* DO NOT Use
Use these Mounting Holes for 1-inch-back Seat Position
Use these Mounting Holes for Standard Seat Position
* DO NOT Use
Use these Mounting Holes for 1-inch-back Seat Position
Use these Mounting Holes for Standard Seat Position
DO NOT use these mounting holes.
* DO NOT Use
Use these Mounting Holes for 1-inch-back Seat Position
Use these Mounting Holes for Standard Seat Position
* DO NOT Use
Use these Mounting Holes for 1-inch-back Seat Position
Use these Mounting Holes for Standard Seat Position
Rear of Seat

**NOTE: Only the 22-inch wide seats have these mounting holes. DO NOT use these mounting holes.*

FIGURE 7.5 Adjusting Seat Position on Seat Frame

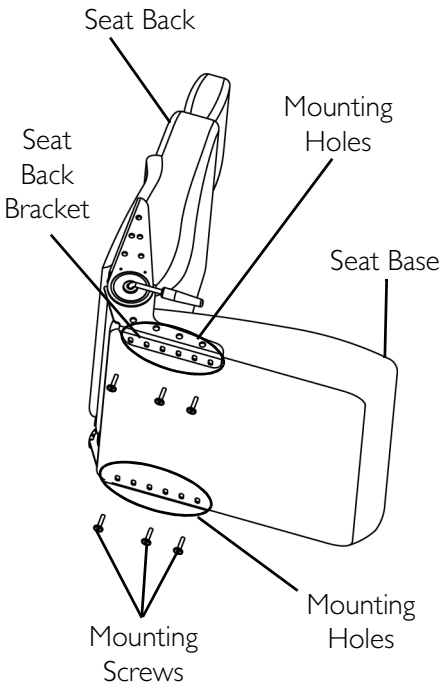
Adjusting Seat Depth

NOTE: For this procedure, refer to FIGURE 7.6 on page 40.

1. Remove the seat. Refer to Removing/Installing the Seat Assembly on page 36.
2. Remove the seat base from the seat assembly. Refer to Adjusting Seat Position on Seat Frame on page 39.
3. Remove the six mounting screws located under the seat that secure the seat back assembly in place.
4. Adjust seat back assembly to desired position and reinstall the six mounting screws. Securely tighten.

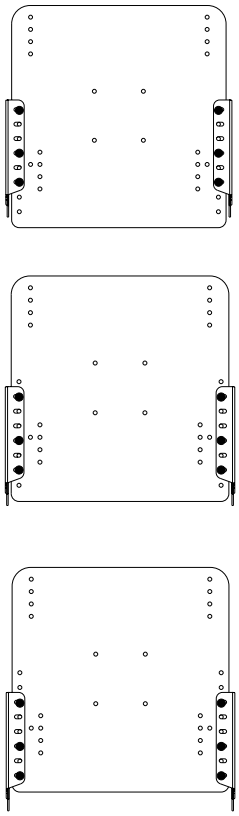
NOTE: Refer to Detail "A" of FIGURE 7.6 for proper seat depth positions. For example, to achieve maximum seat depth, the front mounting hole on the seat back bracket aligns with the third hole on the seat base.

5. Reinstall the seat base onto the seat assembly. Refer to Adjusting Seat Position on Seat Frame on page 39.
6. Reinstall the seat. Refer to Removing/Installing the Seat Assembly on page 36.



DETAIL "A" - SEAT DEPTH POSITIONS

NOTE: Seat depth maximum is at the third seat hole.



Minimum Seat Depth

Seat Depth	Seat Size
16 inch	16 X 18 inch
16 inch	18 X 18 inch
18 inch	20 X 20 inch
18 inch	22 X 20 inch

Middle Seat Depth

Seat Depth	Seat Size
17 inch	16 X 18 inch
17 inch	18 X 18 inch
19 inch	20 X 20 inch
19 inch	22 X 20 inch

Maximum Seat Depth

Seat Depth	Seat Size
18 inch	16 X 18 inch
18 inch	18 X 18 inch
20 inch	20 X 20 inch
20 inch	22 X 20 inch

FIGURE 7.6 Adjusting Seat Depth

Replacing the Seat Positioning Strap

⚠ WARNING

ALWAYS wear your seat positioning strap.

The seat positioning strap is a positioning belt ONLY. It is not designed for use as a safety device withstanding high stress loads such as auto or aircraft safety belts. If signs of wear appear, belt must be replaced IMMEDIATELY.

NOTE: For this procedure, refer to FIGURE 7.7 on page 41.

1. Remove the two mounting screws and washers that secure the seat positioning straps to the seat frame.
2. Remove the two halves of the seat positioning strap from the rear seat frame.
3. Reposition the two new seat positioning strap halves underneath seat rails.
4. Reinstall the two mounting screws and washers that secure the seat positioning straps to the seat frame. Securely tighten.

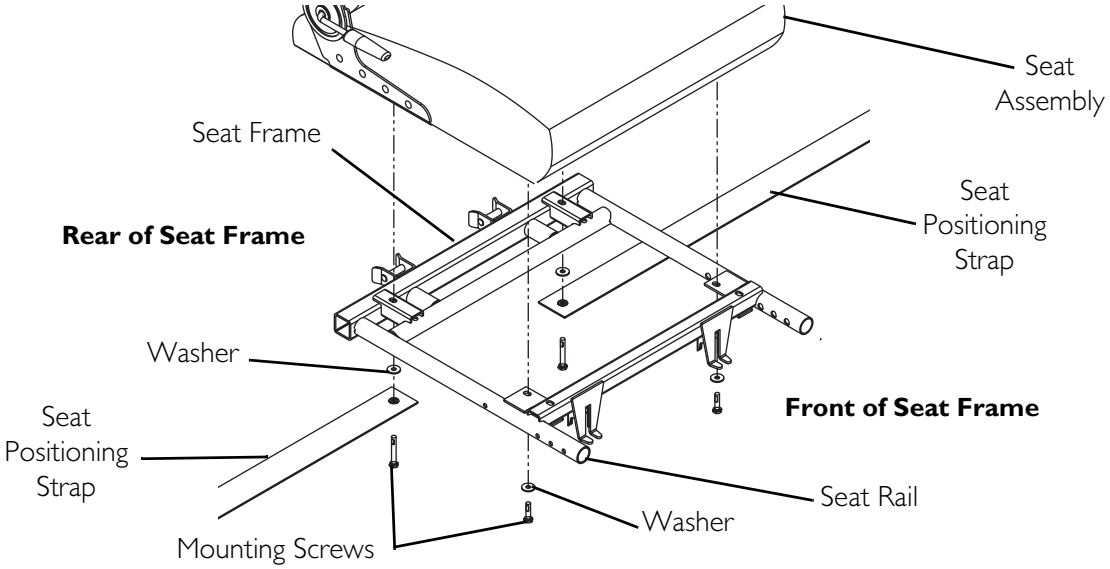


FIGURE 7.7 Replacing the Seat Positioning Strap

SECTION 8—FOOTBOARD ASSEMBLY

⚠ WARNING

After any adjustments, repair or service and before use, make sure that all attaching hardware is tightened securely - otherwise injury or damage may result.

Before performing any maintenance, adjustment or service verify that On/Off switch on the joystick is in the Off position.

Pinch point may occur when rotating the footboard assembly.

DO NOT stand on the flip-up footboard. When getting in or out of the wheelchair, make sure that the flip-up footboard is in the upward position.

LIMITED CLEARANCE BETWEEN FOOTBOARD AND CASTER - The user's feet MUST remain on the footboard while operating the wheelchair. If the user's feet are allowed to rest off the side of the footboard they may come in contact with the caster possibly resulting in injury.

Removing/Installing the Footboard Assembly

NOTE: For this procedure, refer to FIGURE 8.1 on page 43.

Removing

1. Remove the quick release pin that secures the footboard assembly to the wheelchair frame by depressing the button while sliding the pin out.
2. Remove the footboard assembly from the wheelchair frame.

Installing

⚠ WARNING

Make sure the detent balls of the quick release pin are fully released and protruding past the outer edge of the tube before operating the wheelchair. Otherwise, injury and/or damage may result.

Keep detent balls clean.

1. Position the footboard assembly onto the wheelchair frame so that the mounting hole in the wheelchair frame aligns with the desired mounting hole in the footboard assembly.
2. Install the quick release pin by depressing the button while sliding the pin in. Ensure that the detent balls of the quick release pin are fully released and protruding past the outer edge of the tube (Detail "A").

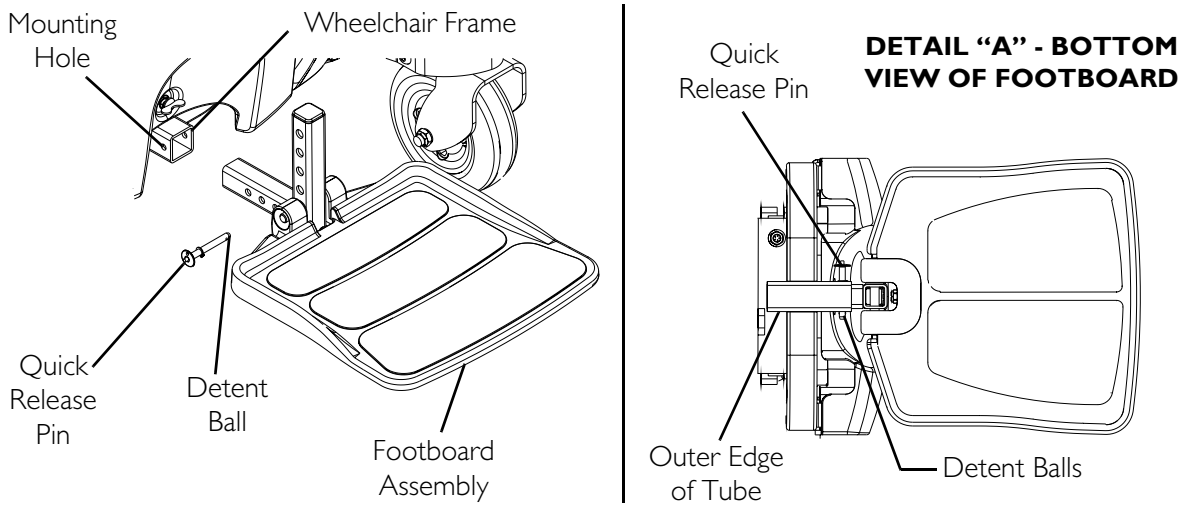


FIGURE 8.1 Removing/Installing the Footboard Assembly

Adjusting the Footboard Assembly

Angle

NOTE: For this procedure, refer to FIGURE 8.2.

1. Loosen the jam nut and set screw located underneath on the back of the footplate.
2. Adjust the set screw in or out to obtain the desired footboard assembly angle.
3. Thread the jam nut and washer inward until it is flush with the footboard bracket.
4. Securely tighten the jam nut and washer to secure the mounting screw in place.

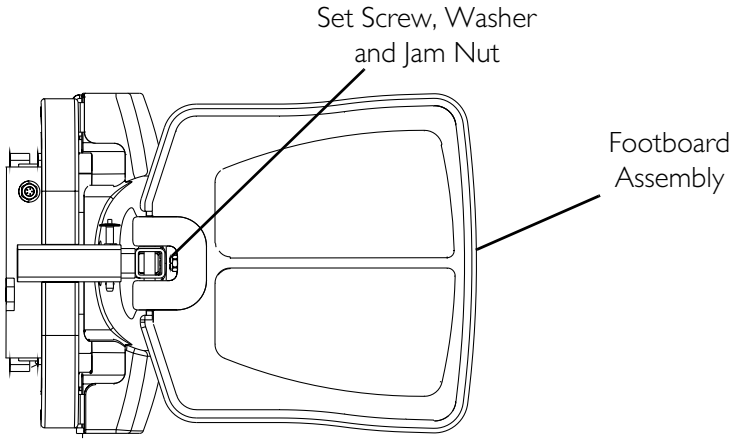


FIGURE 8.2 Adjusting the Footboard Assembly - Angle

Depth

NOTE: For this procedure, refer to FIGURE 8.3.

1. Remove the quick release pin that secures the footboard assembly to the wheelchair frame.

⚠ WARNING

Make sure the detent balls of the quick release pin are fully released and protruding past the outer edge of the tube before operating the wheelchair. Otherwise, injury and/or damage may result.

Keep detent balls clean.

2. Adjust footboard to one of three mounting positions.
3. Install the quick release pin. Make sure the detent balls of the quick release pin are fully released and past the outer edge of the tube (Detail "A").

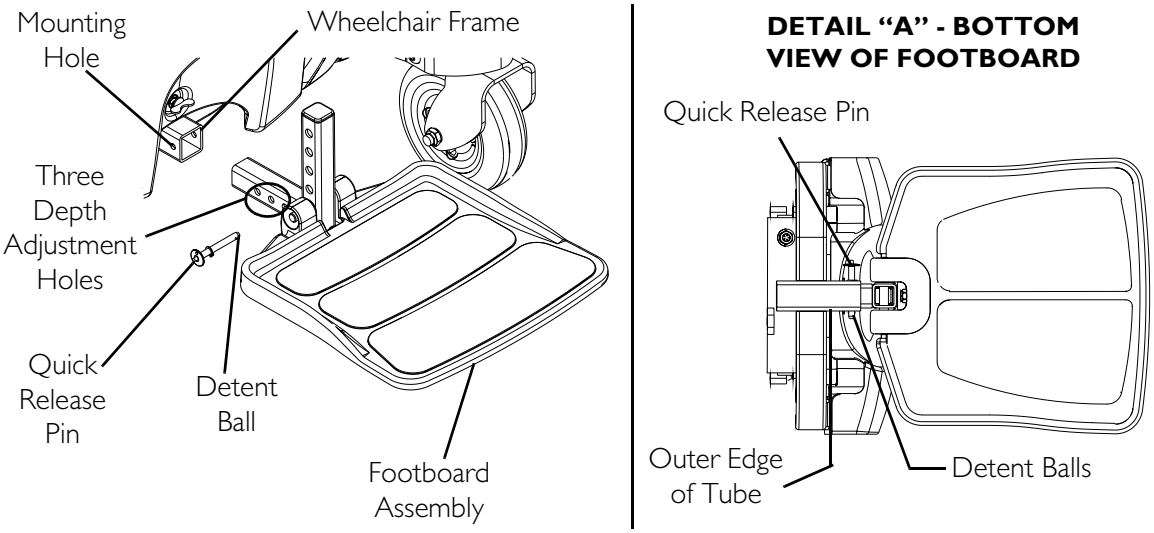


FIGURE 8.3 Adjusting the Footboard Assembly - Depth

SECTION 9—FRONT RIGGINGS

⚠ WARNING

After ANY adjustments, repair or service and before use, make sure that all attaching hardware is tightened securely - otherwise injury or damage may result.

DO NOT stand on the front riggings, otherwise damage may occur. When getting in or out of the wheelchair, make sure that the footplates on the front riggings are in the upward position or moved out of the way.

While the wheelchair is moving, minimum ground clearance for the front rigging is three inches. If the wheelchair is not moving, the front rigging MUST maintain a minimum of one inch ground clearance - otherwise personal injury and damage may result.

Before performing any maintenance, adjustment or service verify that On/Off switch on the joystick is in the Off position.

Installing/Removing Front Riggings

CAUTION

If front riggings are used, then the seat MUST be adjusted to the highest mounting position - otherwise damage may occur.

PW93, PH904A and PHAL4A

NOTE: For this procedure, refer to FIGURE 9.1.

1. If necessary, remove the footboard. Refer to Removing/Installing the Footboard Assembly on page 42.
2. Turn front rigging to the side (open footplate is perpendicular to wheelchair) and position mounting holes in the front rigging hinge plates with hinge pins on the wheelchair frame.
3. Install the front rigging hinge plates onto the hinge pins on the wheelchair frame.

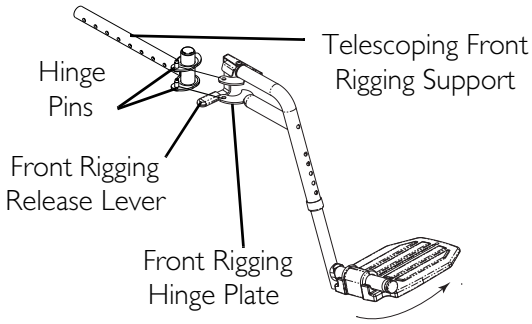


FIGURE 9.1 Installing/Removing Front Riggings - PW93, PH904A and PHAL4A

4. Push the front rigging towards the inside of the wheelchair until it locks into place.

NOTE: The footplate will be on the inside of the wheelchair when locked in place.

5. Repeat STEPS 1-4 for opposite side of wheelchair.
6. To Remove the footrests, push the front rigging release lever inward and rotate the footrest out.

7. Lift up on front rigging and remove from the wheelchair.
8. Repeat STEPS 1-2 for opposite side of wheelchair.

70° and 70° Taper

NOTE: For this procedure, refer to FIGURE 9.2

1. Turn the footrest to the side (open footplate is perpendicular to wheelchair).
2. Insert footrest mounting pin into mounting tube.
3. Push the footrest towards the inside of the wheelchair until it locks into place.

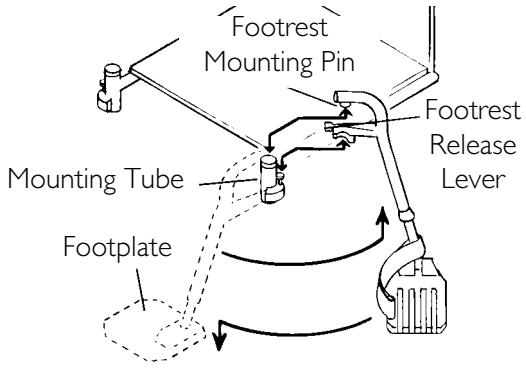


FIGURE 9.2 Installing/Removing Front Riggings - 70° and 70° Taper

NOTE: The footplate will be on the inside of the wheelchair when locked in place.

4. Repeat STEPS 1- 3 for the other footrest assembly.
5. To remove the footrest, push the footrest release lever inward, rotate footrest outward.
6. Adjust footrest height, if desired. Refer to Adjusting Footrest Height on page 46.

Adjusting Footrest Height

Model PHWH93, PW93 and 70°

NOTE: For this procedure, refer to FIGURE 9.3.

1. Remove any accessories from the footrest(s).
2. Remove the footrest from the wheelchair. Refer to Installing/ Removing Front Riggings on page 45.

NOTE: Lay footrest on a flat surface to simplify section.

3. Remove the hex bolt, coved washers and locknut that secure the lower footrest to the footrest support.
4. Reposition the lower footrest to the desired height.
5. Reinstall hex bolt, coved washers and locknut that secure lower footrest to footrest support. Tighten securely.

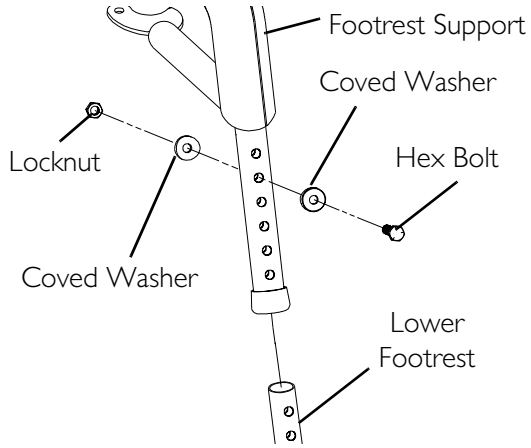


FIGURE 9.3 Adjusting Footrest Height - Model PHWH93, PW93 and 70°

6. Repeat STEPS 1-5 for the opposite side of the wheelchair footrest, if necessary.

7. Reinstall the footrest(s) onto the wheelchair. Refer to Installing/Removing Front Riggings on page 45.
8. Reinstall any accessories onto the footrest(s).

70° Taper

NOTE: For this procedure, refer to FIGURE 9.4.

1. Remove any accessory from the footrest(s).
2. Remove the footrest from the wheelchair. Refer to Installing/Removing Front Riggings on page 45.

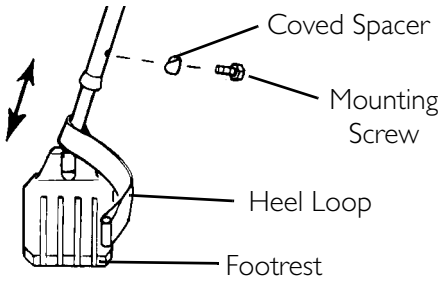


FIGURE 9.4 Installing/Removing Front Riggings - 70° Taper

NOTE: Lay the assembly on a flat surface to improve access to the hardware.

NOTE: Note the position of the spacers before disassembly.

3. Remove the mounting screw and coved spacer that secures the lower footrest assembly.
4. Position the footrest assembly to the desired height.
5. Secure lower footrest assembly with existing mounting screw and coved spacer. Securely tighten.

NOTE: Make sure spacers are positioned properly when reassembling to prevent damage to the frame mounting tubes.

6. Reinstall the footrest(s) onto the wheelchair. Refer to Installing/Removing Front Riggings on page 45.
7. Reinstall any accessory onto the footrest(s).

Model PH904A and PHAL4A

NOTE: For this procedure, refer to FIGURE 9.5.

NOTE: PH904A style front rigging shown. PHAL4A front rigging adjust the same way.

1. Loosen, but do not remove the lug bolt and locknut that secure the lower footrest to the footrest support.
2. Reposition the lower footrest to the desired height.

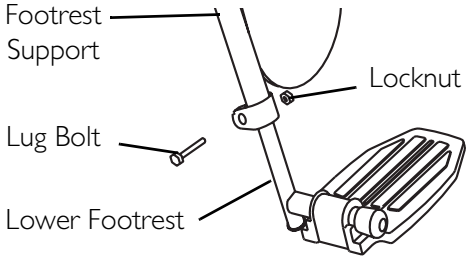


FIGURE 9.5 Adjusting Footrest Height - Model PH904A and PHAL4A

3. Securely tighten the lug bolt and locknut that secure the lower footrest to the footrest support.
4. Repeat STEPS 1-3 for the opposite side of the wheelchair footrest, if necessary.

Raising/Lowering Elevating Front Riggings

NOTE: For this procedure, refer to FIGURE 9.6.

1. Perform one of the following:
   - Raising - Pull back on the release lever and raise front rigging to the desired height.
   - Lowering - Support front rigging with one hand away from the release lever. Push release lever downward with other hand.

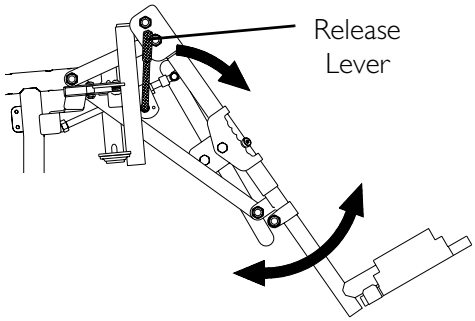


FIGURE 9.6 Raising/Lowering Elevating Front Riggings

Adjusting/Replacing Telescoping Front Rigging Supports

NOTE: For this procedure, refer to FIGURE 9.7 on page 49.

NOTE: When adjusting the telescoping front rigging support depth, ensure the footplate does not interfere with the caster wheel rotation.

NOTE: Telescoping front rigging supports may be extended up to 2-inches from the wheelchair frame in 1-inch increments. This adjustment does not affect seat depth.

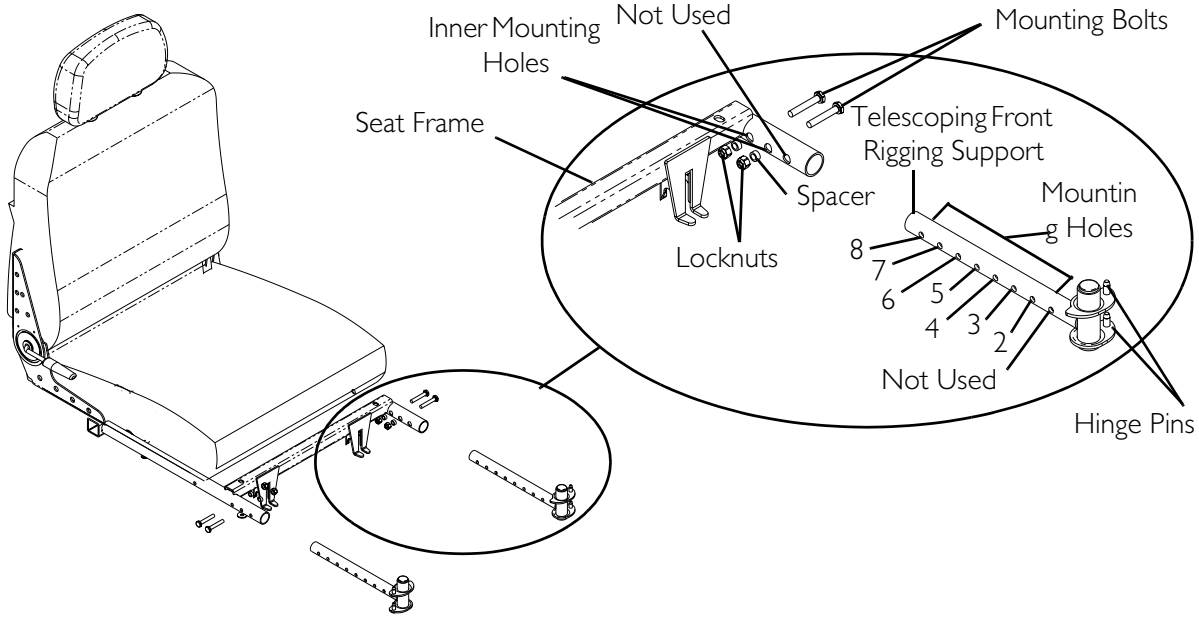
NOTE: When installing the front riggings support tubes, ensure that the hinge pins are on the outside of the wheelchair facing away from the seat frame.

1. Remove the seat. Refer to Removing/Installing the Seat Assembly on page 36.
2. Remove the two socket bolts and locknuts that secure telescoping front rigging support to the seat frame.

3. Perform one of the following:
   - Adjusting - Align the appropriate mounting hole of the telescoping front rigging support with the front mounting hole in the seat frame tubes to achieve the desired depth as shown in FIGURE 9.7.
   - Replacing - Perform the following steps:
     i. Remove the existing telescoping front rigging support from the wheelchair frame.
     ii. Insert the new telescoping front rigging support into the seat frame.
     iii. Align the appropriate mounting hole of the telescoping front rigging support with the front mounting hole in the seat frame tubes to achieve the desired depth as shown in FIGURE 9.7.

NOTE: The footplate will be on the inside of the wheelchair when locked in place.

4. Using the two socket bolts and locknuts, secure the telescoping front rigging support to the seat frame as shown in FIGURE 9.7.
5. If necessary, repeat STEPS 2-4 on remaining telescoping front rigging support.
6. Reinstall the seat. Refer to Removing/Installing the Seat Assembly on page 36.



STANDARD POSITION			1 INCH OUT			2 INCHES OUT		
18 inches wide	20 inches wide	22 inches wide	18 inches wide	20 inches wide	22 inches wide	18 inches wide	20 inches wide	22 inches wide
Holes 2 and 3	Holes 2 and 3	Holes 3 and 4	Holes 3 and 4	Holes 3 and 4	Holes 5 and 6	Holes 4 and 5	Holes 4 and 5	Holes 6 and 7

FIGURE 9.7 Adjusting/Replacing Telescoping Front Rigging Supports

Installing Adjustable Angle Flip-up Footplate Hinge

NOTE: For this procedure, refer to FIGURE 9.8.

1. Position footplate hinge on the footrest support tube at the desired height.
2. Position mounting screw, washers, spacer, and locknut on the footrest support as shown (FIGURE 9.8).
3. Flip the footplate hinge to the up position.

NOTE: The footplate hinge will fall to the down position.

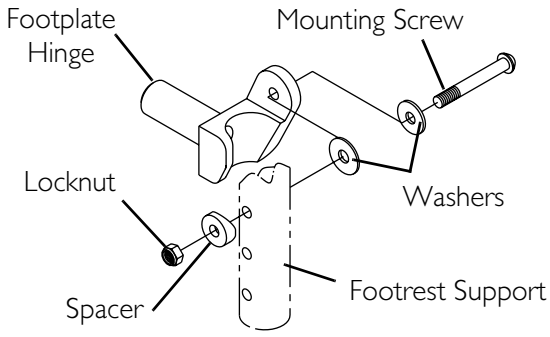


FIGURE 9.8 Installing Adjustable Angle Flip-up Footplate Hinge

4. Tighten the mounting screw, washer, and locknut that secure the footplate hinge to the footrest support until the footplate hinge remains in the up position.
5. Check the up and down motion of the footplate hinge to make sure the user of the wheelchair can operate the footplates easily.

NOTE: If footplate's motion is too tight, loosen the mounting screw and locknut approximately ¼-turn counterclockwise.

NOTE: If the footplate's motion is too loose, tighten mounting screw and locknut approximately ¼-turn clockwise.

6. Adjust footplate. Refer to Installing Adjustable Angle Flip-up Footplates on page 50.

Installing Adjustable Angle Flip-up Footplates

NOTE: For this procedure, refer to FIGURE 9.9.

1. Slide the half clamp over the footplate hinge.
2. Hand tighten the two flat screws that secure the footplate to the half clamp.
3. Adjust the footplates to the necessary angle and depth for the user. Refer to Adjusting Adjustable Angle Flip-Up Footplates on page 51.

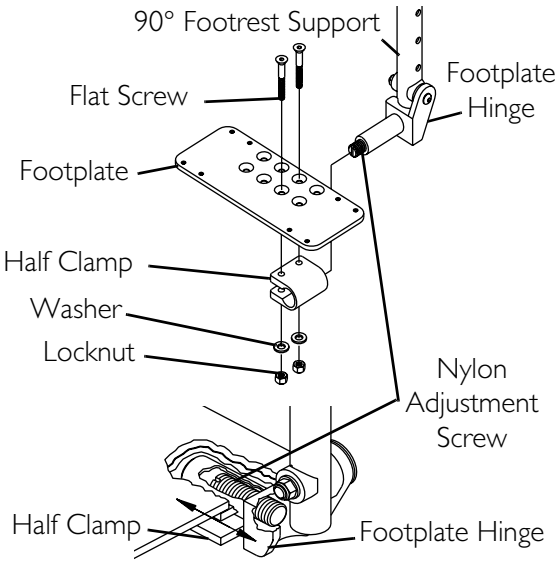


FIGURE 9.9 Installing Adjustable Angle Flip-up Footplates

Adjusting Adjustable Angle Flip-Up Footplates

Depth Adjustment

NOTE: For this procedure, refer to FIGURE 9.9 on page 50.

1. Remove the two flat screws, washers and locknuts that secure footplate to the half clamp.

NOTE: Observe the angle of the footplate for reinstallation.

2. Move footplate to one of four mounting positions.

NOTE: If desired depth is still not obtained, rotate the half clamp on the footplate hinge 180°.

3. Retighten the two flat screws, washers and locknuts.

NOTE: The settings for positioning the footplates on the half-clamps may vary for each footplate.

Angle Adjustment

NOTE: For this procedure, refer to FIGURE 9.9 on page 50 and FIGURE 9.10.

1. Loosen, but DO NOT remove, the two flat screws, washer and locknuts that secure the footplate to the footplate hinge (FIGURE 9.9).
2. Position the footplate to the necessary angle to accommodate the user (FIGURE 9.10).
3. Retighten the two flat screws, washers and locknuts.

Side View of Footplate and Footrest Support

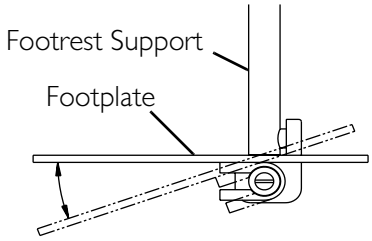


FIGURE 9.10 Angle Adjustment

Perpendicular and/or Inversion/Eversion Adjustment

NOTE: For this procedure, refer to FIGURE 9.9 on page 50 and FIGURE 9.11.

NOTE: It is not necessary to remove the footplate to perform this adjustment.

1. Insert a flathead screwdriver through the half clamp on the footplate (FIGURE 9.9).
2. Slowly turn nylon adjustment screw in or out until footplate is perpendicular to the footrest assembly or the desired inversion or eversion is obtained (FIGURE 9.11).

Front View of Footplate and Footrest Support

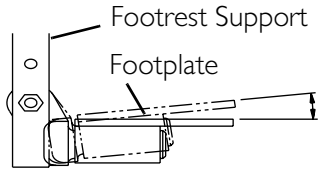


FIGURE 9.11 Perpendicular and/or Inversion/Eversion Adjustment

Composite/Articulating Footplate Heel Loop Replacement

NOTE: For this procedure, refer to FIGURE 9.12.

NOTE: To assemble, reverse these procedures.

NOTE: When securing heel loop to the footrest assembly, tighten mounting screw until the spacer is secure.

Disassembly

Composite

1. Remove the mounting screw and coved washer that secures the lower half of the footrest to the swingaway footrest assembly.
2. Remove the lower footrest assembly.
3. Remove the mounting screw and locknut that secure the heel loop to the footrest.
4. Slide heel strap over cane of footrest assembly.

Articulating

1. Remove the two mounting screws that secure the heel loop to the articulating footplate.

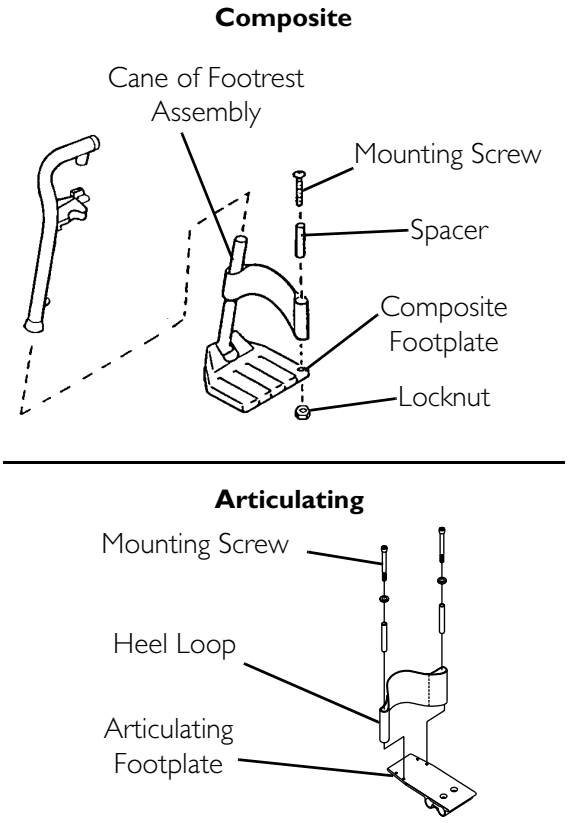


FIGURE 9.12 Composite/Articulating Footplate Heel Loop Replacement

Installing/Removing Elevating Legrests

NOTE: For this procedure, refer to FIGURE 9.13.

Installing

1. Turn legrest to side (open footplate is perpendicular to wheelchair).
2. Install the legrest hinge plates onto the hinge pins on the wheelchair frame.
3. Rotate legrest toward the inside of the wheelchair until it locks in place.

NOTE: The footplate will be on the inside of the wheelchair when locked in place.

4. Repeat STEPS 1-3 for the opposite legrest.
5. After the user is seated in wheelchair, adjust footplate to correct height by loosening nut and sliding the lower footrest assembly up or down until desired height is achieved.

Removing

1. Push the legrest release handle toward the inside of the wheelchair (facing the front of the wheelchair) and swing the legrest to the outside of the wheelchair.
2. Lift up on the legrest and remove from the wheelchair.
3. Repeat STEPS 1- 2 for opposite side of wheelchair.

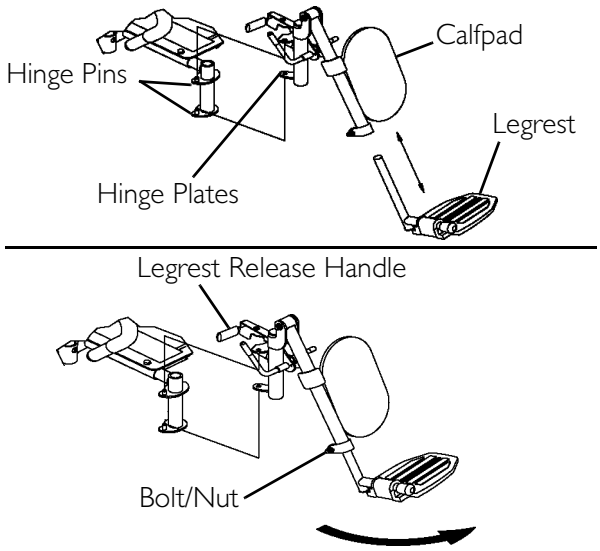


FIGURE 9.13 Installing/Removing Elevating Legrests

Raising/Lowering Elevating Legrests and/or Adjusting Calfpads

NOTE: For this procedure, refer to FIGURE 9.14.

Raising/Lowering Elevating Legrests

1. Perform one of the following:
   - Raising - Pull back on the release lever until the leg is at the desired height.
   - Lowering - Support leg with one hand and push release lever downward with other hand.

Adjusting Calfpads

1. Turn the calfpad towards the outside of the wheelchair.
2. Slide the calfpad up or down until the desired position is obtained.

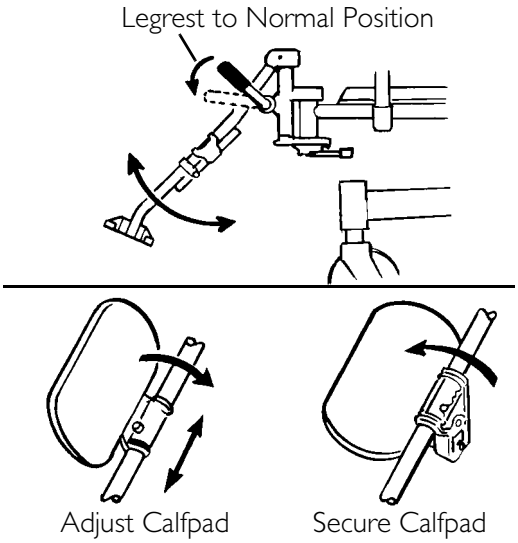


FIGURE 9.14 Raising/Lowering Elevating Legrests and/or Adjusting Calfpads

NOTE: If one of the top two calfpad adjustment positions is being used, the legrest will need to be raised to avoid interference with the front stabilizers while going over obstacles or going UP and down ramps. Refer to Raising/Lowering Elevating Legrests on page 54.

3. Turn the calfpad towards the inside of the wheelchair.

SECTION 10—SHROUD/WHEELS

⚠ WARNING

After any adjustments, repair or service and before use, make sure that all attaching hardware is tightened securely - otherwise injury or damage may result.

Before performing any maintenance, adjustment or service verify that On/Off switch on the joystick is in the Off position.

Replacing the Flat Free Tires on the Wheel Rim

⚠ WARNING

DO NOT attempt to replace flat free tires. This procedure MUST be performed by a qualified technician.

NOTE: During initial use of the wheelchair, the user may experience flat spots on the wheels. Flat spots will vanish with continued use of the wheelchair.

Removing/Installing the Shrouds

NOTE: For this procedure, refer to FIGURE 10.1 on page 56.

Removing

1. Remove the seat assembly. Refer to Removing/Installing the Seat Assembly on page 36.
2. Perform one of the following:
   - Top Shroud - Lift up on rear edge of top shroud to release the four hook and loop strips that secure the top shroud to the base frame (Detail “A”).
   - Front Shroud - Turn release knob ¼-turn to the unlocked position and lift up to remove front shroud from base frame hooks (Detail “B”).

Installing

1. Perform one of the following:
   - Top Shroud - Position top shroud on to the base frame and gently press down on top shroud to secure the four hook and loop strips that secure the top shroud to the base frame (Detail "A").
   - Front Shroud - Position front shroud onto the two base frame hooks. Turn release knob ¼-turn to the locked position (Detail "B").
2. Reinstall the seat. Refer to Removing/Installing the Seat Assembly on page 36.

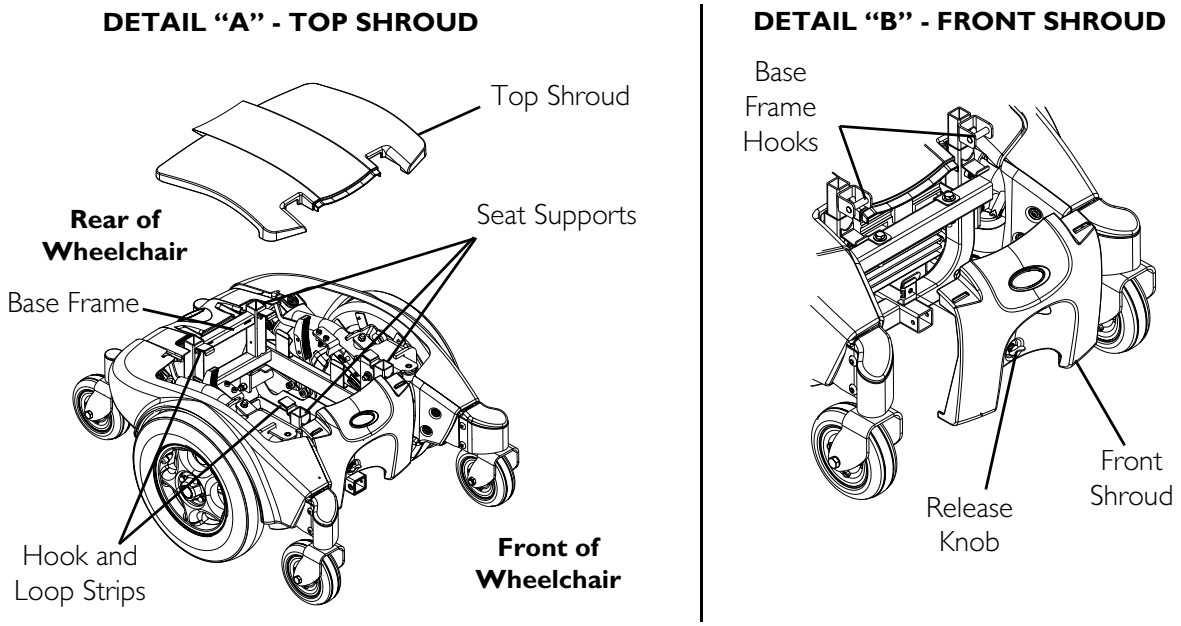


FIGURE 10.1 Removing/Installing the Shrouds

Engaging/Disengaging Motor Release Lever

⚠ WARNING

DO NOT engage or disengage the motor release lever until the On/Off switch on the joystick is in the Off position.

CAUTION

Ensure both motor release levers are fully engaged before driving the wheelchair

NOTE: For this procedure, refer to FIGURE 10.2.

NOTE: The motor lock disengagement/engagement allows freewheeling or joystick controlled operation. Freewheeling allows an attendant to maneuver the wheelchair without power.

1. Locate the motor release handles on the motors protruding through the shrouds by the rear springs.
2. Perform one of the following:
   - To disengage the motor release levers - Slide the motor lock lever towards the outside of the wheelchair (free wheel position) (Detail "A").

NOTE: This allows the wheelchair to freewheel for pushing if necessary

   - To engage the motor release levers - Slide the motor lock handles towards the center of the wheelchair (drive position) (Detail "A").

NOTE: This allows the motors to drive the wheels.

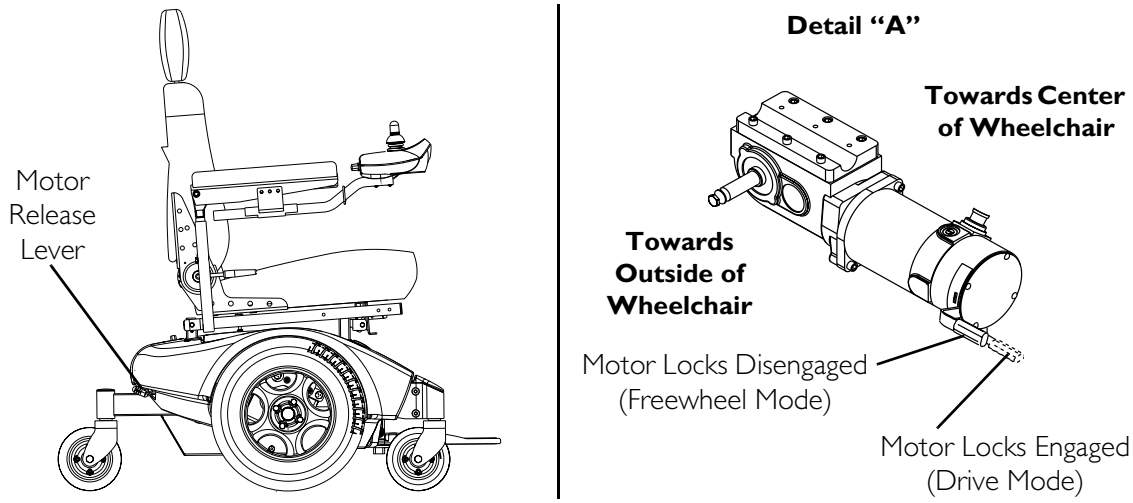


FIGURE 10.2 Engaging/Disengaging Motor Release Lever

Replacing Front/Rear Caster Assemblies

NOTE: For this procedure, refer to FIGURE 10.3.

NOTE: Front and rear caster assemblies are replaced in the same manner.

NOTE: When replacing the front/rear caster assemblies, it is necessary to brace the caster assemblies to prevent the wheel from spinning.

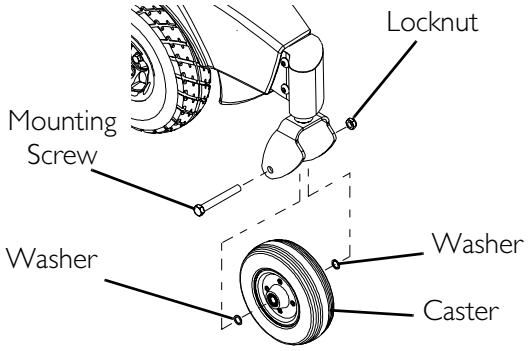


FIGURE 10.3 Replacing Front/Rear Caster Assemblies

1. Remove the mounting screw, two washers, and locknut that secures the caster to the fork.
2. Remove the caster and discard.
3. Secure new caster to fork with existing mounting screw, two washers and locknut (FIGURE 10.3). Securely tighten.

Adjusting Forks

NOTE: For this procedure, refer to FIGURE 10.4.

1. Remove the dust cover.
2. To properly tighten caster journal system and guard against flutter, perform the following check:
   A. Tip back the wheelchair.
   B. Pivot both forks and casters to top of their arc simultaneously.
   C. Let casters drop to bottom of arc (wheels should swing once to one-side, then IMMEDIATELY rest in a straight downward position).
   D. Adjust locknuts according to freedom of caster swing.
3. Test wheelchair for maneuverability.
4. Readjust locknuts if necessary, and repeat STEPS 1-3 until correct.

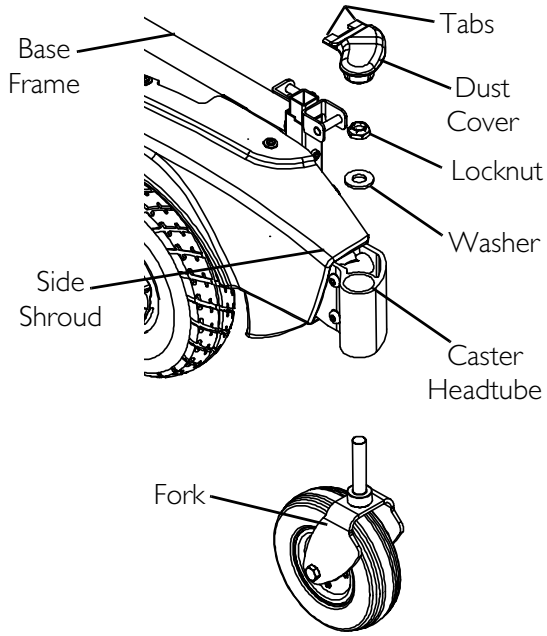


FIGURE 10.4 Adjusting Forks

5. Snap dust cover into the caster headtube ensuring that the tabs are under the plastic side shrouds.

NOTE: Components exploded for clarity. There is no need to remove the fork from the base frame.

SECTION 11—BATTERIES

⚠WARNING

Make sure power to the wheelchair is Off before performing this section.

NEVER allow any of your tools and/or battery cable(s) to contact both battery terminal(s)/post(s) at the same time. An electrical short may occur and serious personal injury or damage may occur.

The use of rubber gloves is recommended when working with batteries.

Always use a battery lifting strap when lifting a battery. It is the most convenient method and assures that the battery acid will not spill. It also helps to prolong the life of the battery.

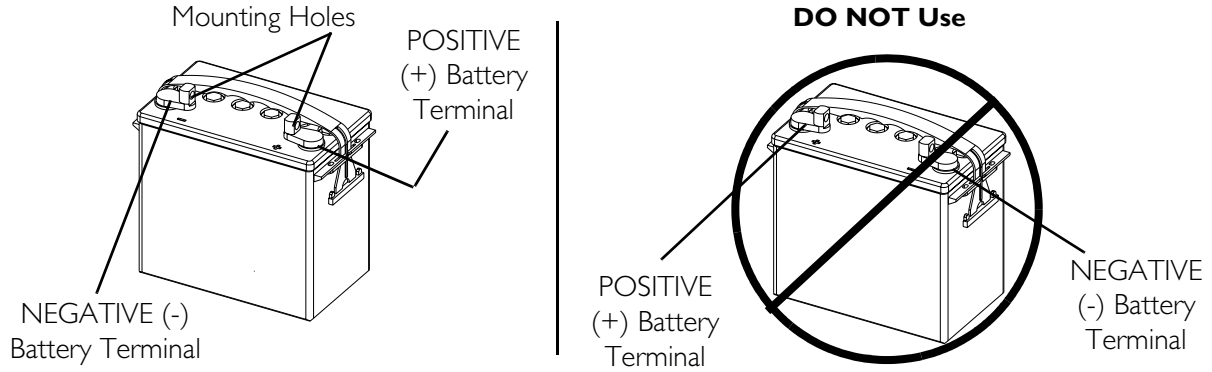
DO NOT tip the batteries. Keep the batteries in an upright position.

Avoid storage or use near external flame or combustible products.

Invacare strongly recommends that battery installation and battery replacement always be done by a qualified technician.

After any adjustments, repair or service and before use, make sure all attaching hardware is tightened securely - otherwise injury or damage may result.

Battery terminal configuration shown below MUST be used. Batteries that have the reversed terminal configuration MUST NOT be used - otherwise serious injury or damage may occur.



CAUTION

When connecting the battery cables to the battery(ies), the battery cable(s) MUST be connected to the battery terminal(s)/post(s) as shown in FIGURE 11.3 otherwise damage to the battery may result.

For proper battery connection, batteries MUST use post style terminals with mounting holes through the terminal.

NOTE: If there is battery acid in the bottom of the battery tray or on the sides of the battery(ies), apply baking soda to these areas to neutralize the battery acid. Before reinstalling the existing or new battery(ies), clean the baking soda from the battery tray or battery(ies) being sure to avoid contact with skin and eyes. Determine source of contamination. NEVER install/reinstall a battery with a cracked or otherwise damaged case.

Installing/Removing the Batteries

NOTE: For this procedure, refer to FIGURE 11.1 on page 61 and FIGURE 11.2 on page 61.

NOTE: Have the following tools available:

TOOL	QTY	COMMENTS
Battery Lifting Strap	1	Supplied
1/2-inch (6 pt) Box Wrench	1	Not Supplied
7/16-inch (6pt) Box Wrench	1	Not Supplied
3/8-inch (6pt) Box Wrench	1	Not Supplied
Diagonal Cutters	1	Not Supplied

Installing

1. Place the wheelchair in a well ventilated area where work can be performed without risking damage to carpeting or floor covering.
2. Verify the joystick On/Off switch is in the Off position and disconnect joystick. Refer to Disconnecting/Connecting the MK5 Joysticks on page 69.
3. Remove the seat. Refer to Removing/Installing the Seat Assembly on page 36.
4. Remove the top shroud. Refer to Removing/Installing the Shrouds on page 55.
5. If necessary, disconnect right and left motor leads to allow access to the front of the battery tray.
6. Move aside the motor leads and controller cable to allow unobstructed access to the front of the battery tray.

NOTE: Perform this section on one battery at a time starting with the rear battery. Repeat STEP 6 to position the remaining battery into the battery tray.

7. Perform one of the following to position the battery into the battery tray:
   - Batteries With Built In Lifting Strap - Use built in lifting strap to position battery into the battery tray (Detail “A” of FIGURE 11.1).
   - Batteries Without Built In Lifting Strap - Use the battery lifting strap to position battery into the battery tray. When battery is in proper position, remove lifting strap (Detail “B” of FIGURE 11.1).
8. Using the battery retaining strap, secure the two batteries into the battery tray.
9. If necessary, connect the wiring harness to the two batteries. Refer to Connecting/Disconnecting the Battery Wiring Harness on page 62.
10. Reconnect RIGHT and LEFT motor leads to allow access to the FRONT of the battery tray, if disconnected in STEP 5.

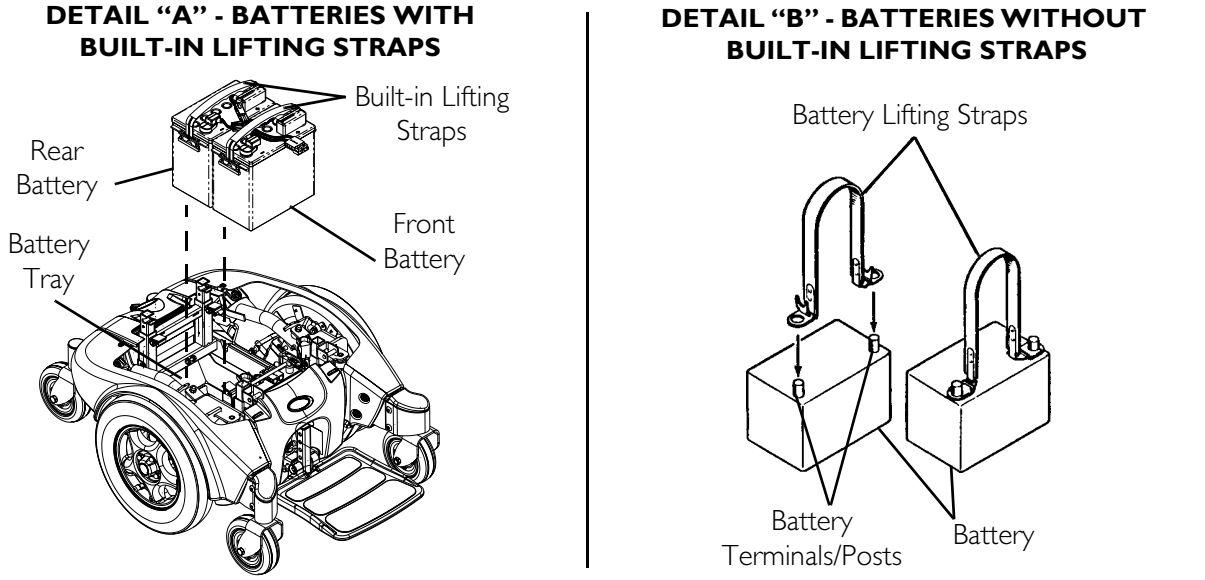
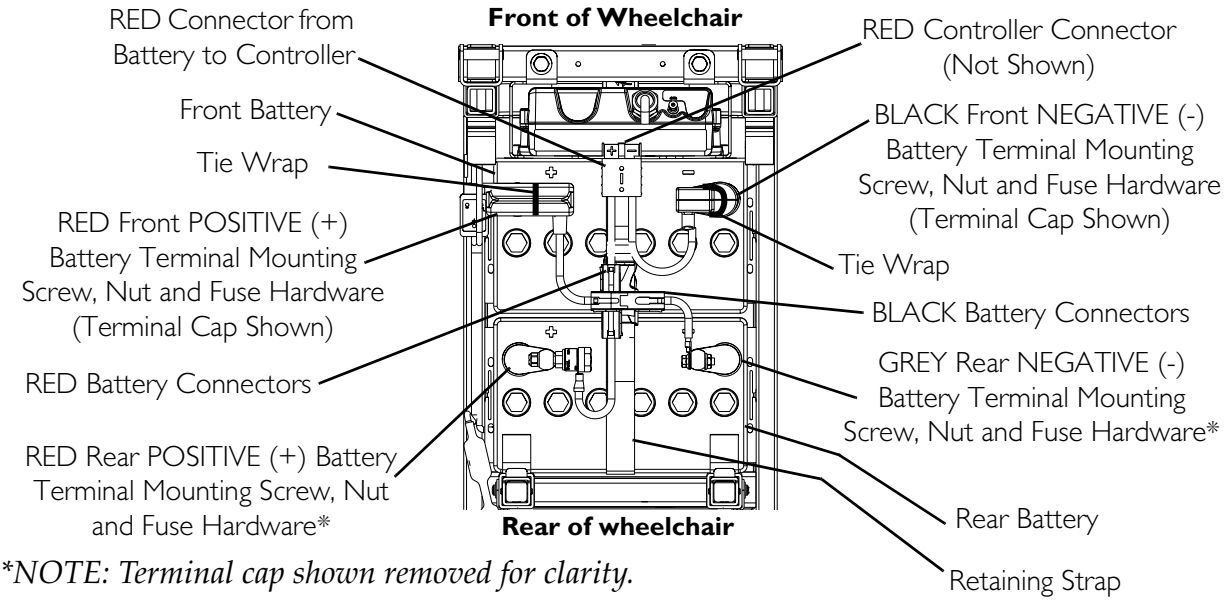


FIGURE 11.1 Batteries with/without Lifting straps

11. Connect the front battery to the controller (RED connector). Refer to FIGURE 11.2.
12. Connect the rear battery to the front battery (RED and BLACK connectors). Refer to FIGURE 11.2.
13. Reinstall the top shroud. Refer to Removing/Installing the Shrouds on page 55.
14. Reinstall the seat. Refer to Removing/Installing the Seat Assembly on page 36.
15. Connect the joystick. Refer to Disconnecting/Connecting the MK5 Joysticks on page 69.

NOTE: New battery(ies) MUST be fully charged before using, otherwise the life of the battery(ies) will be reduced.

16. If necessary, charge the battery(ies). Refer to Charging Batteries on page 64.


Front of Wheelchair
RED Connector from Battery to Controller
Front Battery
Tie Wrap
RED Front POSITIVE (+) Battery Terminal Mounting Screw, Nut and Fuse Hardware (Terminal Cap Shown)
RED Battery Connectors
RED Rear POSITIVE (+) Battery Terminal Mounting Screw, Nut and Fuse Hardware*
Rear of wheelchair
RED Controller Connector (Not Shown)
BLACK Front NEGATIVE (-) Battery Terminal Mounting Screw, Nut and Fuse Hardware (Terminal Cap Shown)
Tie Wrap
BLACK Battery Connectors
GREY Rear NEGATIVE (-) Battery Terminal Mounting Screw, Nut and Fuse Hardware*
Rear Battery
Retaining Strap

**NOTE: Terminal cap shown removed for clarity.*

FIGURE 11.2 Installing/Removing the Batteries

Removing

1. Place the wheelchair in a well ventilated area where work can be performed without risking damage to carpeting or floor covering.
2. Verify the joystick On/Off switch is in the Off position and disconnect joystick. Refer to Disconnecting/Connecting the MK5 Joysticks on page 69.
3. Remove the seat. Refer to Removing/Installing the Seat Assembly on page 36.
4. Remove the top shroud. Refer to Removing/Installing the Shrouds on page 55.
5. If necessary, disconnect right and left motor leads to allow access to the front of the battery tray.
6. Disconnect the front battery from controller (RED connector). Refer to FIGURE 11.2.
7. Move aside the motor leads and controller cable to allow unobstructed access to the front of the battery tray.
8. Disconnect the rear battery from the front battery (RED and BLACK connectors). Refer to FIGURE 11.2.
9. If necessary, disconnect the wiring harness from batteries. Refer to Connecting/Disconnecting the Battery Wiring Harness on page 62.
10. Unfasten the retaining strap that secures the two batteries in the battery tray.

NOTE: Perform this section on one battery at a time starting with the FRONT battery. Repeat STEP 10 to remove remaining battery from battery tray.

11. Perform one of the following to remove the battery from the battery tray:
    - Batteries With Built-in Lifting Strap- Use built in lifting strap to remove the battery from the battery tray (Detail "A" of FIGURE 11.1).
    - Batteries Without Built-in Lifting Strap- Use the battery lifting strap to remove the battery from the battery tray (Detail "B" of FIGURE 11.1).

Connecting/Disconnecting the Battery Wiring Harness

NOTE: Perform this section on one battery at a time starting with the front battery.

NOTE: The front battery has three connectors - two to the rear battery wiring harness (RED and BLACK) and one to the controller cable (RED), and the rear battery has two connectors (RED and BLACK) to the front battery wiring harness.

NOTE: Both the front and rear wiring harnesses are shipped with the POSITIVE (+) RED battery cable and mounting screw connected. Use the exposed, threaded portion of the mounting screw to secure the POSITIVE (+) RED cable to the POSITIVE (+) terminal.

⚠WARNING

DO NOT remove fuse or mounting hardware from POSITIVE (+) RED battery cable/mounting screw.

All battery terminal covers (two on the front battery and two on the rear battery) MUST be installed prior to use.

Connecting

NOTE: For this procedure, refer to FIGURE 11.3 on page 63.

1. Peel back RED battery terminal cover to expose RED battery cable connection to battery terminal.
2. Peel back BLACK battery terminal cover from BLACK battery cable on front battery or GREY battery terminal cover from BLACK battery cable on rear battery.
3. Using the mounting screws and nuts, secure the NEGATIVE (-) BLACK battery cable to NEGATIVE (-) battery terminal/post as shown in FIGURE 11.3.
4. Using the mounting screws and nuts, secure the POSITIVE (+) RED battery cable to POSITIVE (+) battery terminal/post as shown in FIGURE 11.3.
5. Verify wiring harness is correctly installed and securely tightened.
6. Verify proper battery orientation.
7. Reposition battery terminal covers over battery post(s).
8. Using new tie-wraps, secure the terminal covers to the battery terminals as shown in FIGURE 11.3.
9. Repeat STEPS 1-8 to install and connect the rear battery to the rear battery harness.

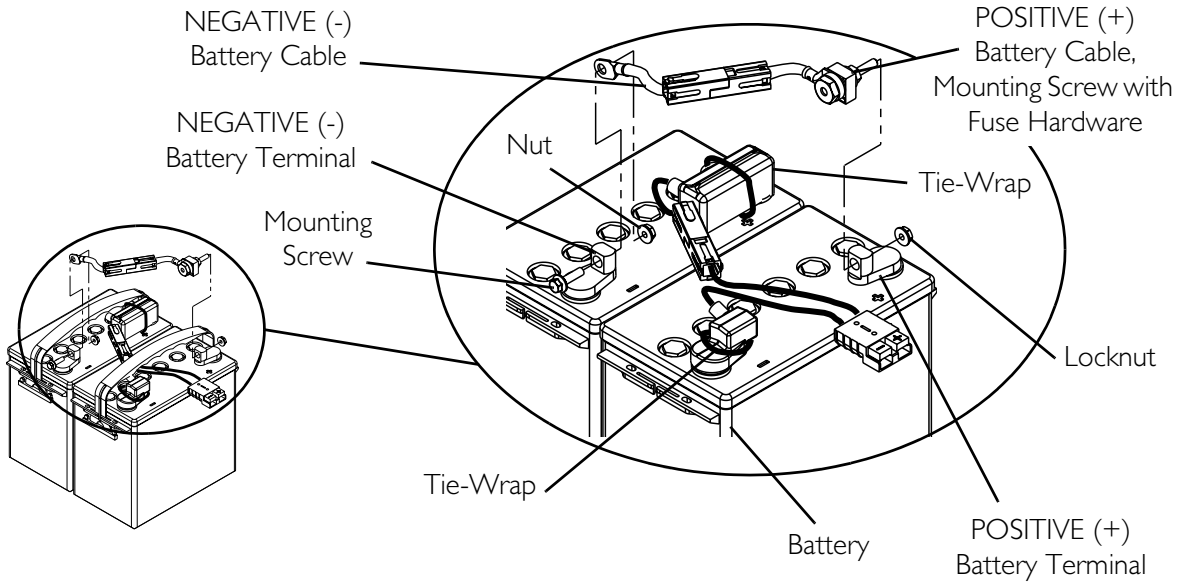


FIGURE 11.3 Connecting/Disconnecting the Battery Wiring Harness

Disconnecting

NOTE: For this procedure, refer to FIGURE 11.3 on page 63.

1. Remove the existing tie-wraps that secure the battery terminal covers to the battery terminals.
2. Peel back RED battery terminal cover to expose RED battery cable connection to battery terminal.

3. Peel back BLACK battery terminal cover from BLACK battery cable on front battery or GREY battery terminal cover from BLACK battery cable on rear battery.
4. Remove the mounting screws and nuts that secure the POSITIVE (+) RED battery cable to the POSITIVE (+) battery terminal/post as shown in FIGURE 11.3.
5. Remove the mounting screws and nuts that secure the NEGATIVE (-) BLACK battery cable to the NEGATIVE (-) battery terminal/post as shown in FIGURE 11.3.
6. Set wiring harness aside.
7. Repeat STEPS 1-6 to disconnect the rear battery from the rear battery harness.

Charging Batteries

⚠ DANGER

When using an extension cord, use only a three wire extension cord having at least 16 AWG (American Wire Gauge) wire and the same or higher electrical rating as the devise being connected. Use of improper extension cord could result in a risk of fire and electric shock. Three prong to two prong adapters should not be used. Use of three prong adapters can result in improper grounding and present a shock hazard to the user.

⚠WARNING

Never attempt to recharge the batteries by attaching cables directly to the battery terminals.

DO NOT attempt to recharge the batteries and operate the wheelchair at the same time.

DO NOT attempt to recharge the batteries when the wheelchair has been exposed to ANY type of moisture.

DO NOT attempt to recharge the batteries when the wheelchair is outside.

DO NOT sit in the wheelchair while charging the batteries.

DO NOT attempt to recharge the batteries using both the on-board battery charger AND an independent battery charger (plugged into the joystick charger port) at the SAME time. Doing so will reduce the life of the batteries.

READ and CAREFULLY follow the manufactures instructions for each charger (supplied or purchased). If charging instructions are not supplied, consult a qualified technician for proper procedures prior to use.

CAUTION

New batteries MUST be fully charged prior to initial use of the wheelchair.

Always fully charge new batteries before initial use or battery life will be reduced.

As a general rule, you should recharge your batteries as frequently as possible to assure the longest possible life and to minimize required charging time. Plan to recharge them when you do not anticipate using the wheelchair.

Some basic concepts which will help you understand this automatic process are:

The amount of electrical current drawn within a given time to charge a battery is called "charge rate". If, due to usage, the charge stored in the battery is low, the charge rate is high. As a charge builds up, the charge rate is reduced, and the battery charger rate decreases to a "trickle charge".

NOTE: If the batteries need to be charged more often or take longer to charge than normal, they may need to be replaced. Contact a qualified technician.

NOTE: The batteries can be charged using the on-board battery charger or by plugging an independent battery charger into the port located on the front of the SPJ-80/DPJ/MPJ joysticks.

Battery Charger Operation

⚠WARNING

READ and CAREFULLY follow the manufacturer's instructions for each charger (supplied or purchased). If charging instructions are not supplied, consult a qualified technician for proper procedures prior to use.

If the circuit breaker trips repeatedly, IMMEDIATELY unplug charger and contact dealer or a qualified technician.

Three prong to two prong adapters should not be used. Using three prong adapters can result in improper grounding and present a shock hazard to user.

On-Board Battery Charger

⚠WARNING

Use of improper extension cord could result in risk of fire and electric shock.

When using an extension cord, use only a three wire extension cord having at least 16 AWG (American Wire Gauge) wire and the same or higher electrical rating as the device being connected.

Ensure the pins of the extension cord plug are the same number, size, and shape as those on the charger.

DO NOT under any circumstances cut or remove the round grounding plug from the charger AC cable plug or the extension cord plug.

NOTE: For this procedure, refer to FIGURE 11.4 on page 66.

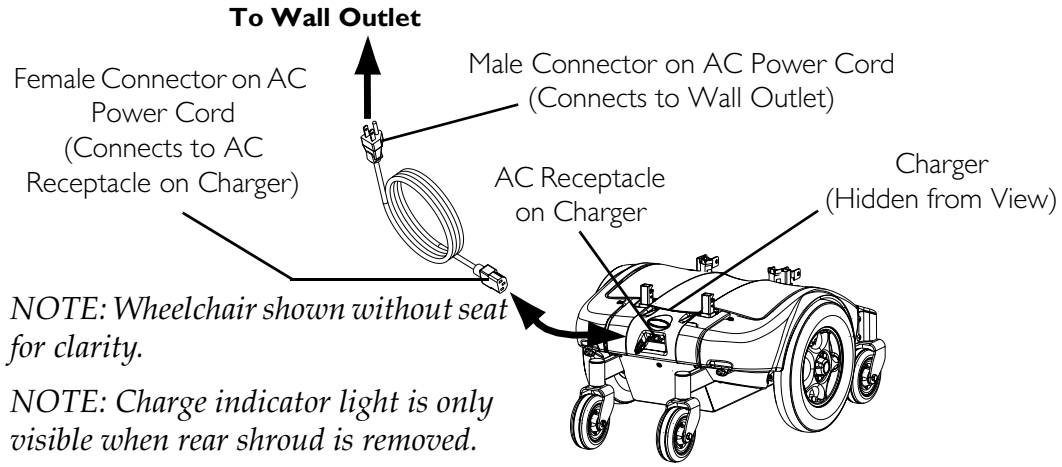
NOTE: Charge indicator light is only visible with rear shroud removed.

1. Plug the female connector of the AC power cord (supplied) to the AC receptacle on the charger and plug in the male connector on the AC power cord into the wall outlet.
2. The On/Off LED indicator illuminates solid RED indicating that the charger is on.
3. If the On/Off LED indicator is "Blinking" RED, this is abnormal. Unplug AC power cord from the on-board battery charger and wall outlet. Contact Invacare at the number listed on the back page of this manual.

4. When the On/Off LED indicator light is off, charger is off.
5. When the Charge LED indicator light is YELLOW, the batteries are charging.
6. When the Charge LED indicator light is solid GREEN, the batteries are fully charged (as their condition will allow). At this point, the charger automatically stops charging.
7. When charging is complete, unplug the male connector of the AC power cord from the wall outlet and then unplug the female connector of the AC power cord from the AC receptacle on the charger.

⚠WARNING

DO NOT operate wheelchair with AC power cord attached to the wheelchair.


To Wall Outlet
Female Connector on AC Power Cord (Connects to AC Receptacle on Charger)
Male Connector on AC Power Cord (Connects to Wall Outlet)
AC Receptacle on Charger
Charger (Hidden from View)
NOTE: Wheelchair shown without seat for clarity.
NOTE: Charge indicator light is only visible when rear shroud is removed.

CHARGING INDICATOR	STATUS
YELLOW	Charging (Under 80%)
"Blinking" YELLOW	Partially Charges (Over 80%)
Solid GREEN	Fully Charges
LED "Off"	Charger Disconnected
Solid RED or "Blinking" RED	Under Voltage
	Over Voltage
	Over Temperature

FIGURE 11.4 On-Board Battery Charger

Independent Charger

⚠WARNING

READ and CAREFULLY follow the individual instructions for each charger (supplied or purchased). If charging instructions are not supplied, consult a qualified technician for proper procedures.

CAUTION

DO NOT use an independent charger with an output rating of over 8A (amps). Otherwise, damage may occur.

NOTE: For this procedure, refer to FIGURE 11.5 on page 67.

NOTE: The charger port located on the Front of the joystick requires the use of an independent charger. The independent charger is NOT supplied with the wheelchair.

Required Items: Battery Charger*, Power Cord**

**NOTE: Item not supplied.*

***NOTE: AC power cord (3-prong plug, 15 ampere current rating; industrial type).*

Wheelchair with MK_5 SPJ-80/DPJ/MPJ/SPJ+ joystick:

1. Attach the battery charger connector to the charger port on the front of the joystick.
2. Plug the charger's AC power cord or extension into the grounded 110-volt wall outlet.
3. Unplug the AC power cord or extension once charging is complete.

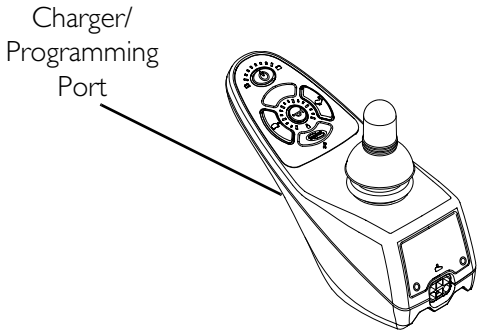


FIGURE 11.5 Independent Charger

SECTION 12—ELECTRONICS

⚠ WARNING

After any adjustments, repair or service and before use, make sure that all attaching hardware is tightened securely - otherwise injury or damage may result.

Before performing any maintenance, adjustment or service verify that On/Off switch on the joystick is in the Off position.

Repositioning the Joystick

NOTE: For this procedure, refer to FIGURE 12.1.

NOTE: Take note of position and orientation of mounting hardware for reinstalling the joystick assembly.

1. Turn the adjustment lock lever to release the joystick mounting tube from the mounting bracket.
2. Remove the joystick from the wheelchair.
3. Remove the three hex mounting screws, spacers and locknuts that secure the mounting bracket to the three mounting holes on the arm frame.

NOTE: The mounting bracket is mounted to the inside of the arm frame.

4. Reposition the mounting bracket on the opposite arm frame.
5. Using the three hex mounting screws, spacers and locknuts secure the mounting bracket to the three mounting holes of the arm frame.
6. If necessary, perform the following to reposition the adjustment lock:
   A. Slide the adjustment lock from the mounting bracket.
   B. Rotate adjustment lock 180° and slide adjustment lock over the opposite end of the mounting bracket.
7. Slide joystick mounting tube through the mounting bracket to the desired position and secure adjustment lock to tube by turning lever on adjustment lock.

NOTE: Joystick not shown.

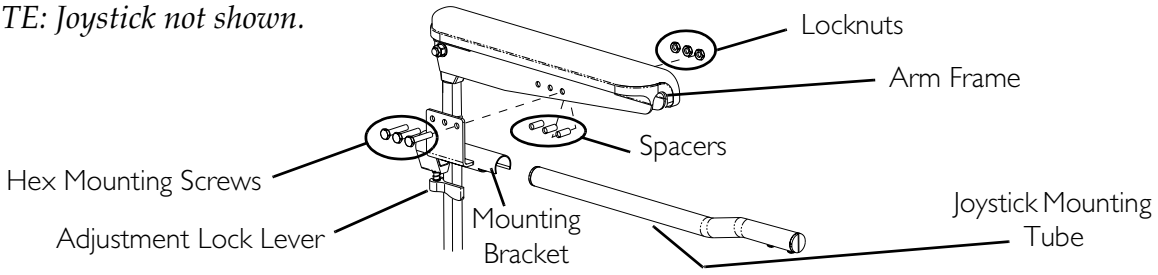


FIGURE 12.1 Repositioning the Joystick

Disconnecting/Connecting the MK_5 Joysticks

NOTE: For this procedure, refer to FIGURE 12.2.

Disconnecting

1. Loosen the thumb screws on the joystick connector.
2. Disconnect the joystick connector from the controller connector.

Connecting

1. Align the joystick connector with the controller connector.
2. Secure the joystick connector to the controller connector using the thumb screws on the controller connector.

⚠ WARNING

The excess joystick cable must be coiled, and tie-wrapped to the rear of the seat frame to ensure that cable does NOT become entangled or damaged during normal operation of seating system - otherwise injury or damage may result.

3. If necessary, coil and tie wrap excess joystick cable to rear of seat frame.

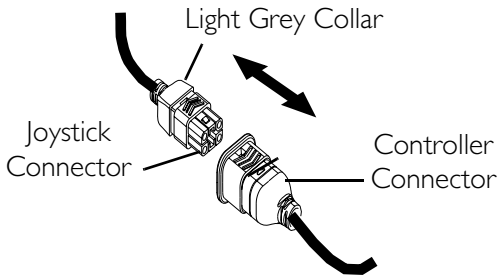


FIGURE 12.2 Disconnecting/Connecting the MK5 Joysticks

Programming the Control Module

⚠ WARNING

DO NOT attempt to program the control module. This section MUST be performed by a qualified technician.

NOTE: For this procedure, refer to FIGURE 12.3.

NOTE: Connect programmer to multi-function charger port located on front of joystick as shown in FIGURE 12.3.

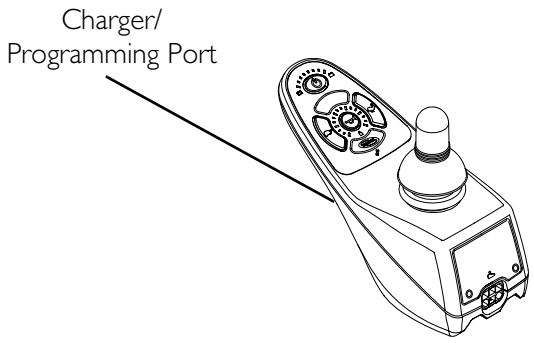


FIGURE 12.3 Programming the Control Module

NOTES

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PLEASE NOTE: THE WARRANTY BELOW HAS BEEN DRAFTED TO COMPLY WITH FEDERAL LAW APPLICABLE TO PRODUCTS MANUFACTURED AFTER JULY 4, 1975.

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For warranty service, please contact the dealer from whom you purchased your Invacare product. In the event you do not receive satisfactory warranty service, please write directly to Invacare at the address on the bottom of the back cover. Provide dealer's name address, date of purchase, indicate nature of the defect and, if the product is serialized, indicate the serial number. Do not return products to our factory without our prior consent.

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